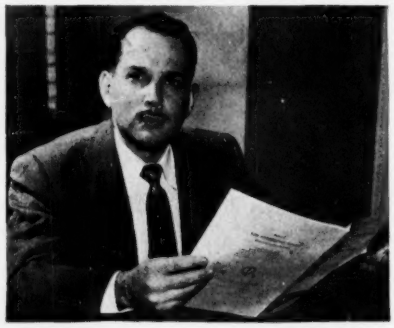
Chemical Week

November 29, 1952 Price 35 cents



Keeping tabs and looking ahead—sounds simple but it's key to Monsanto's finance setup . p. 19

Sun Chemical's Aaron Permut authors CW Report on fast-growing phthalocyanine pigments . . p. 31

Look for wider use of aluminum in process equipment as metal makers push research . . . p. 51

Grace and Davison are kith and kin, but their collaboration is anomalously independent . p. 57

Penicillin picture proves that, profitwise, an old "wonder" drug is less than wonderful . . . p. 69

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Chemical Week

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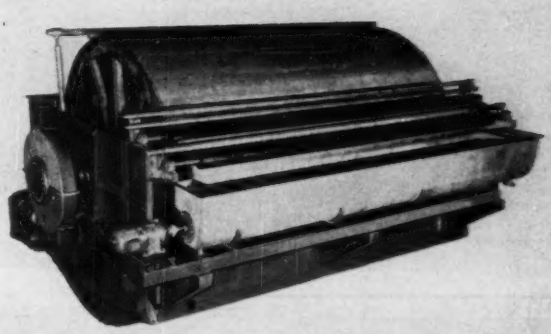

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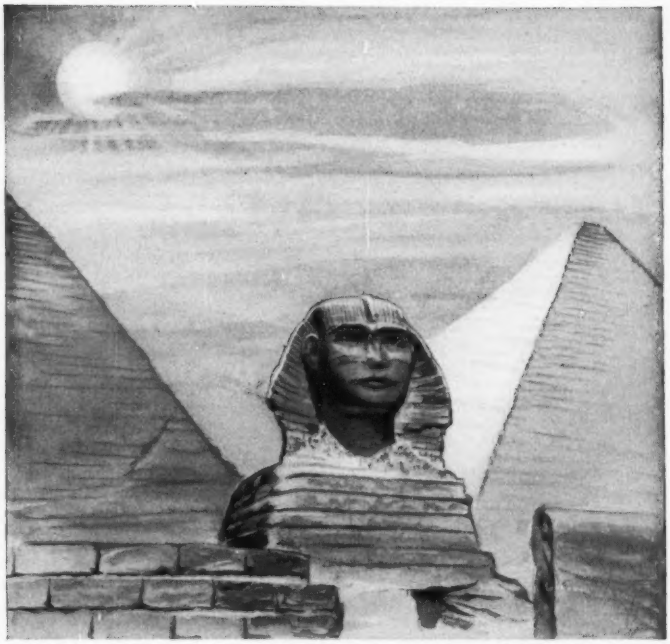

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OPINION

Nine Points in Favor

To THE EDITOR: It was my pleasure to work with W. Cameron Caswell when we both were with Westvaco. This made his article, "You Decide: Competitors or Partners" (Nov. 1), doubly interesting. My compliments to him for his statement that "middlemen are essential." We heavy chemical jobbers (I speak only for these) have for so long been looked on as "the wrong person at the family reunion" that it is gratifying that someone else believes as we do.

We have for years been torn between the desire of the producer to cut us out of the picture (theoretically he then gets our profit), and the consumer's desire to buy direct.

On the producer's side—we jobbers must not attempt to get or keep business which by economics belongs to the producer. We should pass this on to our producer. (This statement will not be well received by many of my cohorts.)

In the distributor's behalf:

1. Our stocks are the shock absorbers between the producer and the consumer.
2. Often we operate entirely on lcl and cl freight differential, plus the producers' cl and lcl differential.
3. We serve a time and place utility.
4. We give immediate service and information to our customers that cannot be economically duplicated by our producers.
5. Our credit know-how in our trade area is realistic.
6. Our sales costs are amortized over many items (from many producers) to each customer.
7. We can be more sensitive to the economy and needs of our trade area.
8. Our representatives are either college graduates in chemistry, or have enough practical training to be of real value.
9. As local people we are not subject to the stigma of "big business," however wrong that stigma is.

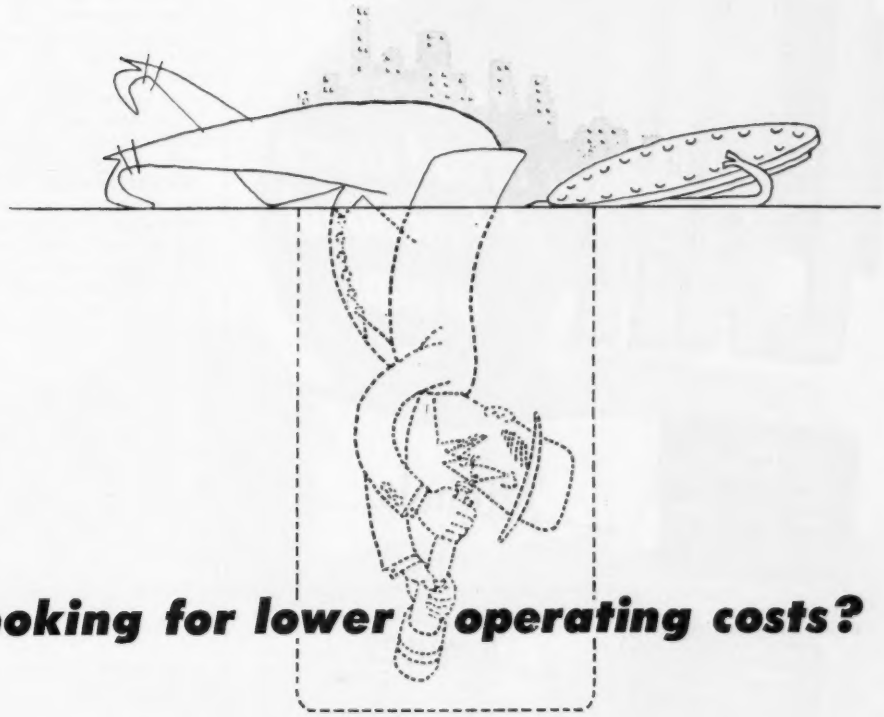
Incidentally, I read CW from cover to cover each week. It's a must for me.

RUSSEL H. BEATIE
Manager, Chemical Division
Reid Supply Co.
Wichita, Kans.

Grades Not Enough

To THE EDITOR: . . . The observations on college recruiting ("Welcome Mat is Out," Oct. 18) are very interesting and, in general, agree with our own.

Two things which we have found



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Our newsletter "Chemonomics", reviewing technical and economic news of the chemical process industries, will be sent upon request on company stationery.

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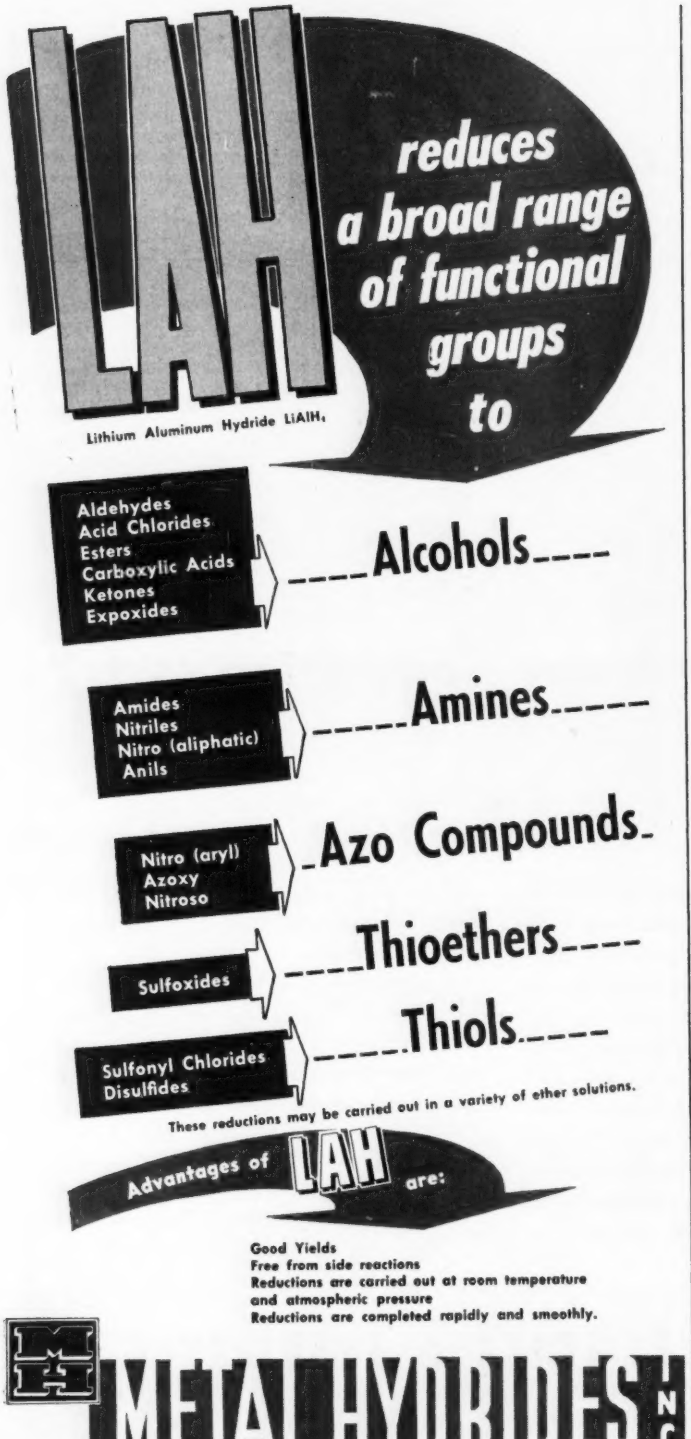


OPINION . . . . . .

beneficial in our campus visits are group discussions and faculty appraisals. Both, in our opinion, deserve more attention. We realize that in some schools it is difficult to schedule group discussions for a large number of companies, but the advantages to both industry and the student are very worthwhile.

Faculty appraisals of students are also important and can have real significance if based upon careful analysis by individual professors. Currently, many appraisals appear to be casual observations and often seem to be based largely on grade records. We believe professors often underestimate the influence their assessment of students has in the placement pattern. We are aware, of course, that in large schools, few professors can be expected to become intimately acquainted with many students. We do note, however, as time goes on, considerable improvement on this matter in many schools and are hopeful our observations are indicative of a trend.

E. F. du Pont
Director
E. I. du Pont de Nemours & Co.
Wilmington, Delaware

Include AS&R

To The Editor: In the Nov. 15 issue . . . you have a very excellent article on indium. . . . You make mention of the Indium Corp. and Cerro de Pasco as the two principal producers in this country and the pioneers of indium applications. . . .

For many years we have been producing indium, and our annual production is every bit as large if not larger than the two companies which you mention. . . . As far as pioneering indium applications, the trade will certainly stand behind us in any statement to the effect that we have been amongst the leaders in that field of endeavor also.

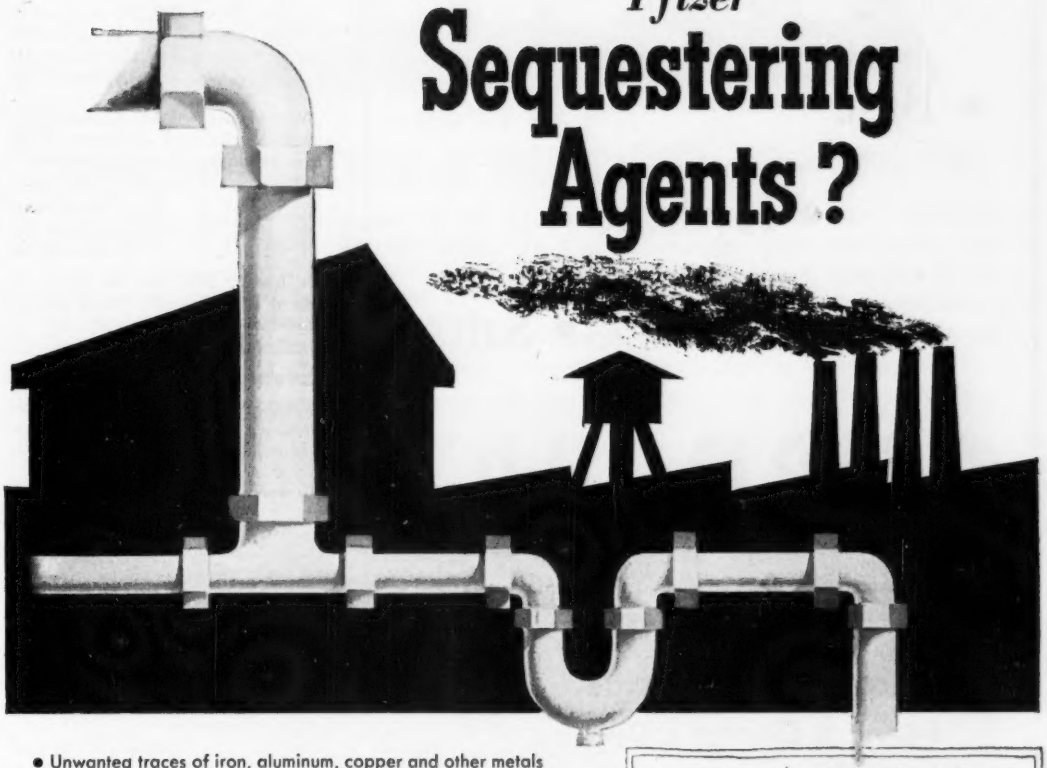
P. E. Caron
American Smelting and Refining Co.
New York, New York

You are certainly right, Reader Caron. American Smelting & Refining was mentioned in a previous roundup on indium (CIW, Jan. 20, '51), *but the*

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

Do You Know the "Ins and Outs" of these *Pfizer* Sequestering Agents?



• Unwanted traces of iron, aluminum, copper and other metals picked up from pipe lines and processing equipment can be rendered inactive by the use of a Pfizer sequestering agent. You can put "in" Pfizer Citric or Gluconic Acid—or one of their derivatives*— to sequester "out" the metallic contaminants which interfere with efficient operation in your plant.

Pfizer Citrates and Gluconates are recommended as sequestering agents in...

The textile industry...to inactivate trace metals in dyeing, bleaching, kier boiling and mercerizing.

The leather industry...to adjust tanning solutions to the proper pH without precipitation.

Oil and fat industry...to inactivate trace metals which lead to rancidity.

Weed killer formulations...to prevent formation of insoluble, inactive salts in hard water areas.

Municipal and industrial water systems...to prevent the precipitation of metallic contaminants.

*Sodium Citrate, Sodium Gluconate, Ammonium Gluconate

PUT "IN"	SEQUESTER "OUT"		pH
CITRIC ACID Sequestering action of 100 parts of acid	Iron (Ferric)	19 Parts	7
	Aluminum	19 Parts	7
	Copper	26 Parts	7
	Zinc	44 Parts	7
	Cobalt	95 Parts	10
GLUCONIC ACID Sequestering action of 100 parts of acid	Iron (Ferric)	24 Parts	7
	Aluminum	4 Parts	7
	Copper	26 Parts	7
	Zinc	27 Parts	7
	Cobalt	6 Parts	10

Pfizer has a wealth of information on the effectiveness of these Citrate and Gluconate sequestering agents. For additional data, write:

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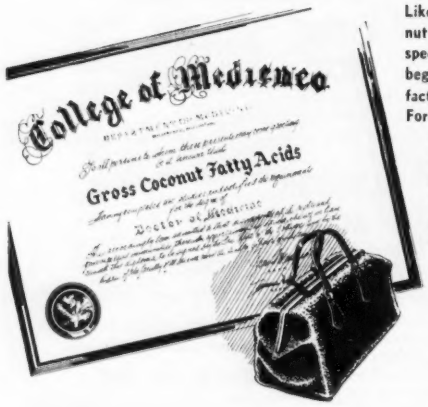

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recent article was more concerned with Canadian developments.—ED.

Middleman Clarified

TO THE EDITOR: Mr. W. C. Caswell has done an excellent job in clarifying the proper role of the middleman in the chemical sales pattern [CW Report, Nov. 1].

Will reprints of Mr. Caswell's article be available? I would like to use them in our sales training program.

FREDERICK W. Dow
Sales Department
The Dow Chemical Co.
Midland, Mich.

Yes, Reader Dow, reprints are available at 35¢. Quantity prices will be quoted on request.—ED.

Favors Fluorides

TO THE EDITOR: I am in very much agreement with your editorial [on organic gardening] published in CW, Nov. 8.

I would like to suggest that you print more articles dealing with this quackery and others. Then I would suggest that you make reprints available at a nominal cost.

I would like to see an article printed on "Fluoridation of Drinking Water" . . . I am in favor of adding fluorides to drinking water, where it is needed. . . . My personal opinion—this chlorophyll addition to everything is getting to be a racket!

DONALD W. BOLIN
Associate Nutritionist
North Dakota Agricultural College
Fargo, N. D.

"Self-Deluded Honest Folk"

TO THE EDITOR: I have read your editorial [Nov. 8] on organic gardeners. Although the enclosed is too long to print, I thought you might find it interesting. . . . This is a report of my argument in a debate on inorganic vs. organic gardening before the American Shade Tree Conference. . . .

R. MILTON CARLETON
Research Director
Vaughan's Seed Co.
Chicago, Ill.

P.S. It might interest you to know that the organic side of the debate was so badly whipped that my partner . . . made no effort to present additional evidence. . . .; the competition didn't present a single argument that would stand up as evidence.

Reader Carleton's paper is 8½ pages long, but his prose is choice: "Within

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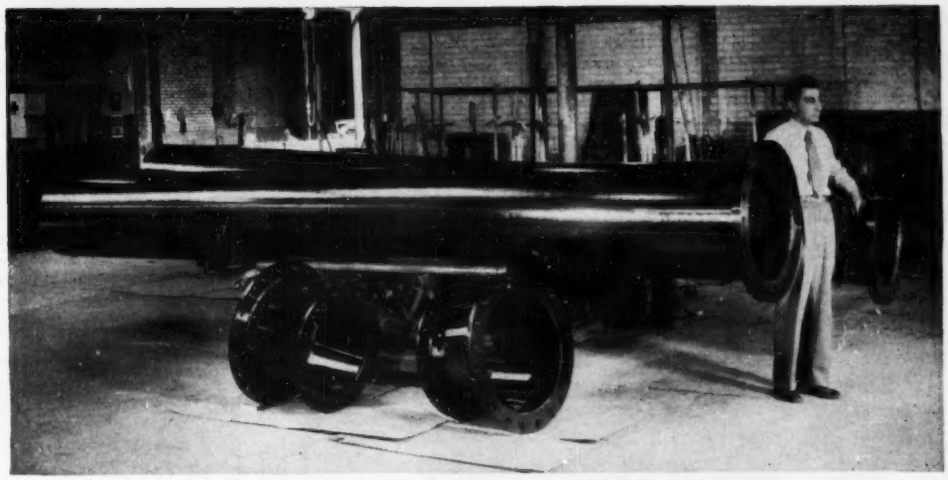

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OPINION . . . . . .

this [organic gardening] group we find an amazing assortment of people. A few of them are outright liars. Some are self-seeking opportunists who are doing exactly what they accuse commercial fertilizer manufacturers of doing—profiting from the sale of a phony product. Most of them, however, seem to me to be self-deluded honest folk, looking for the right answers to the problems of life, but looking down the cellar stairs when they ought to be looking out the window. . . . There is a chink in the organiculturist's armor. It is his habit of citing authorities without fully understanding the significance of what is being quoted, or deliberately lifting a statement of out context and quoting it in support of his muck and manure philosophy." —ED.

Intricate, Complicated

TO THE EDITOR: Congratulations on a very interesting appraisal of the opportunities of vinyl resins in the floor covering field presented in your article "Vinyls Underfoot" (Oct. 25).

I heartily agree that the floor covering field is a very intricate and complicated one, about which relatively little published market information is available. The results of a study we have recently made regarding the trends and market prospects in hard surface floor coverings concur with your findings that vinyls will move fast, principally at the expense of linoleum and enamel felt base flooring. . . .

PHILIP C. WHITE
Pan American Refining Corp.
Texas City, Texas

MEETINGS . .

Synthetic Organic Chemical Mfrs. Assn. of the U.S., thirty-first annual meeting, Commodore Hotel, New York, N.Y., Dec. 3.

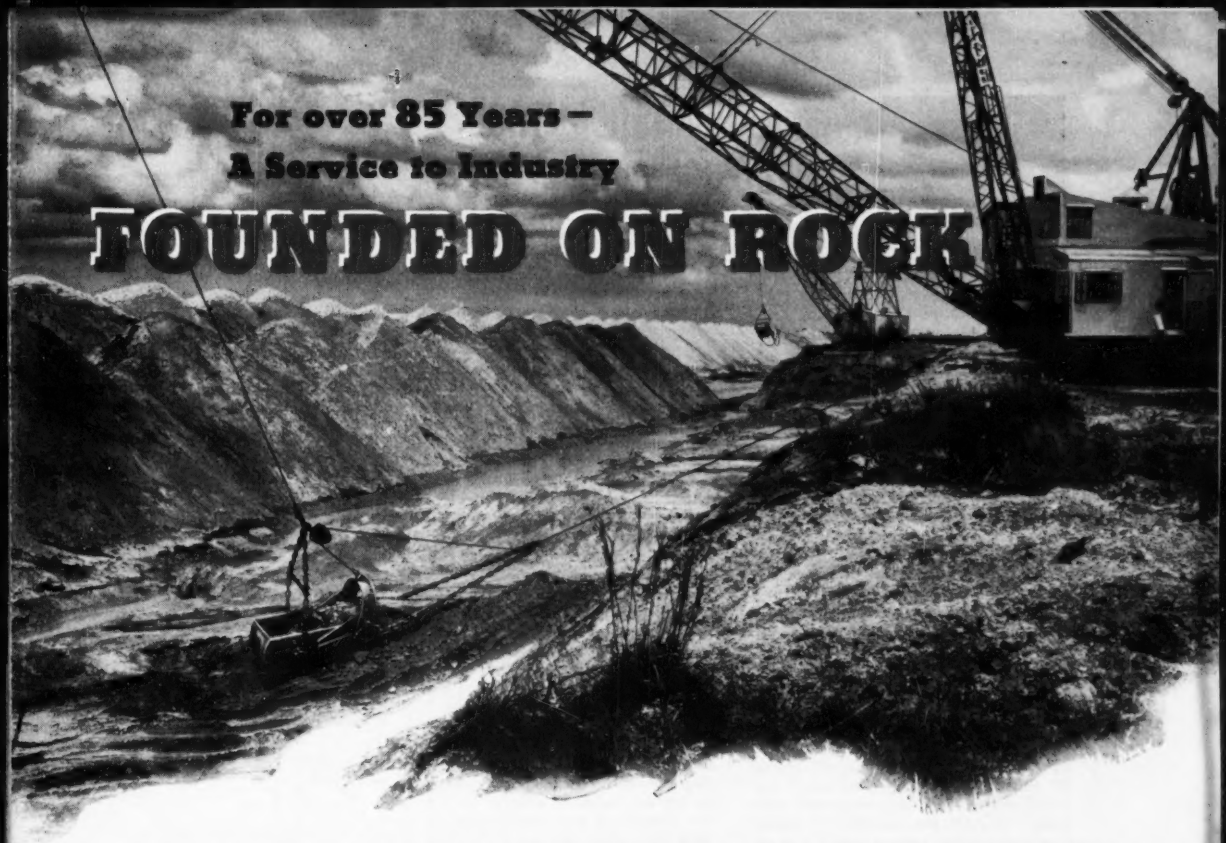
Society of Plastics Industry, Sheeting and Coated Fabrics Division Conference, Commodore Hotel, New York, N.Y., Dec. 4-5.

American Institute of Chem. Engrs., annual meeting, Cleveland Hotel, Cleveland, O., Dec. 7-10.

American Pharmaceutical Mfrs. Assn., mid-year meeting, Waldorf-Astoria Hotel, New York, N.Y., Dec. 8-10.

Society of Cosmetic Chemists, semi-annual meeting, Biltmore Hotel, New York, N.Y., Dec. 11.

Amer. Society of Mechanical Engineers and Society for Advancement of Management, plant maintenance conference, Cleveland, O., Jan. 19-22.



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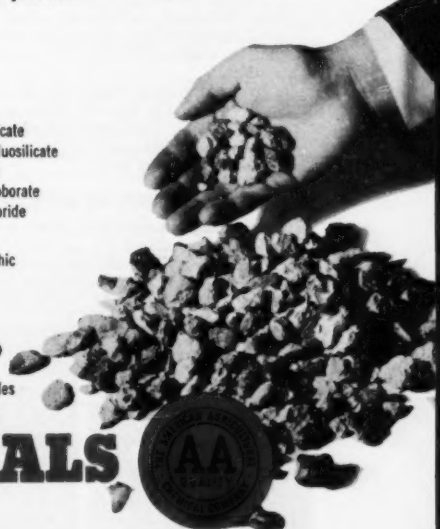

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ARQUADS CONTROL CORROSION AND ALGAE IN OIL RECOVERY OPERATIONS

By Dr. M. R. McCorkle, Technical Director, Armour Chemical Division

Year in and year out, corrosion continues to be the No. 1 problem of the petroleum industry. Thousands of dollars and man-hours have been spent seeking a solution to the problem.

One group of products in particular has proven to be most effective, even in extremely low concentrations. These are Arquads, a series of quaternary ammonium chlorides manufactured by the Armour Chemical Division. They are cationic agents that possess unique wetting properties and high surface activity. Not only have these materials proven to be good protective agents in combating corrosion but they also effectively control bacteria and algae growth.

CORROSION CONTROL IN SOUR CRUDE WELLS

In a sour crude producing well in west Texas, the rate of corrosion was reduced by 93% after the introduction of Arquad 2C. Since cost is an important factor, it is worth noting that this treatment costs about one-half the average of similar treatments using competitive inhibitors.

WATER FLOODING AND BRINE DISPOSAL OPERATION

For years, water systems have been plagued by corrosive salts and bacterial-algae growth, resulting in frequent shut-downs and costly repairs. The results of recent field tests conducted with Arquad S-2C offer convincing evidence that pipelines, secondary recovery and brine disposal operations and other water systems can be made relatively free of these troubles.

In one location at an eastern Oklahoma flood system, the rate of corrosion was reduced 99.5%. In another flood system in eastern Kansas, Arquad S-2C reduced the rate of corrosion by 95%.

CORROSION INHIBITION AND ACID WATERS

In secondary recovery water floods as well as water disposal systems, acid waters are frequently used. Not only do they materially improve injection rates but they assist in opening the formation through the dissolution of corrosion products. However, there is one real disadvantage to using acid waters; they have a severe corrosive action on metal equipment. This can be overcome by the use of Arquad 2C.

STABILITY OF ARQUADS

All Arquads are compatible with cationic and non-ionic materials. They are not compatible with anionic materials, such as soaps or common synthetic detergents. The Arquads are stable under both acid and alkaline conditions. They are also stable in the presence of naturally occurring water-soluble salts and are not precipitated by hard water. Being highly surface-active chemicals, they effectively lower the surface tension of water.

FURTHER INFORMATION AND SAMPLES

For more information on the inhibition of corrosion in the petroleum industry, send for our new technical bulletin E-6. Check the coupon for this bulletin and at the same time order samples of Arquads 2C and S-2C with which to begin your own testing and evaluation of these chemicals.

DUOMEEN T AS ASPHALT ADDITIVE AND ANTI-STRIPPING AGENT

Duomeen T is a fatty diamine developed by the Armour Chemical Division for use as an anti-stripping agent for asphaltic materials. This chemical actually bonds the asphalt to the mineral surface. It can be blended with fatty and/or petroleum acids, together with a suitable diluent, to produce a highly efficient asphalt additive or anti-stripping agent for "on the job" use.

Duomeen T contains both a hydrophobic group, having an affinity for oil, and two polar amino groups which are strongly adsorbed on the surface of aggregates. The result is a strong, permanent bond between the asphalt and mineral, whether the aggregate is wet, damp, dry or cold. Duomeen T requires a heat source, and is recommended for use primarily at asphalt refineries and mixing plants.

SPECIFICATIONS

Melting Range	44°-48°C.
Percent Amine (as diamine)	80% min.
Combining wt.	400 (Theo 320)
Moisture	1% max.

A light tan solid, this chemical is soluble in asphaltic, aromatic and petroleum hydro-carbons. The addition of various acids to Duomeen T improves the adhesion of asphaltic materials to basic aggregate. These include: crude tall oil, tall oil fractions (such as Armour's Neo-Fat 42-12 or Neo-Fat 42-06), fatty acids, fatty acid foots or petroleum acids together with fuel oil diluents.

Duomeen T, having two amine groups, is capable of forming salts with either one or two moles of acidic materials. In some instances, where calcareous minerals predominate, an excess of acid (more than two moles) is beneficial. The mixture of Duomeen T and acids may be diluted with various amounts of petroleum solvent to obtain the desired viscosity. Send for further information and free samples.

THE ARNEELS

A series of high molecular weight aliphatic nitriles, the Arneels offer interesting raw materials for chemical synthesis. They have proved excellent softening agents for several synthetic rubbers and synthetic elastoplastics. They also serve as softening agents in many processes. A recently completed booklet covers this new series of Armour chemicals. For your free copy, send the coupon.

THE DUOMEENS

Complete technical data on a new group of Armour Chemical Division products, the Duomeens, is offered in an illustrated booklet. The Duomeens have exhibited properties valuable in many fields, particularly as asphalt additives, as germicides, and as anti-corrosion agents. Send the coupon for your free copy of this booklet.

ARMOUR CHEMICAL DIVISION
ARMOUR AND COMPANY · 1355 WEST 31ST STREET · CHICAGO 9, ILLINOIS

NON-YELLOWING VINYL CHLORIDE POLYMER STABILIZERS WITH ARMOUR'S NEO-FAT 12

There is an ever-increasing demand for vinyl chloride polymer type products which have improved resistance to the yellowing caused by the action of heat and/or light.

It has been the practice in the past to use stearic acid or low purity mixed coco fatty acids containing varying amounts of stearic, oleic and linoleic fatty acids. Soaps of these acids are not completely compatible and result in "blooming" or cloudy films. The presence of unsaturated acids contributes to undesirable yellowing and in pigmented films produces off-shade colors.

Neo-Fat 12 (lauric) soaps have shown outstanding merit in this application. They are compatible and do not contribute to cloudiness, bloom or yellowing in the vinyl films. The reasons for this are high lauric fatty acid content (95% min.) and the absence of stearic, palmitic and unsaturated acids. In addition, the high acid value, low moisture, and low unsaponifiable content insure a maximum of metal per pound of stabilizer. Stabilizers based on Neo-Fat 12 are extremely resistant to water leaching when used in vinyl films. Send the coupon for a sample of Neo-Fat 12 with which to begin your testing and evaluation of this outstanding new material.

ARMOUR'S FRACTIONATED COCONUT OIL FATTY ACIDS NOW EVEN HIGHER IN PURITY

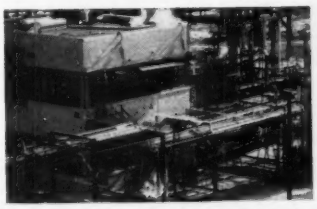
Armour's Neo-Fat coco acids are now available in concentrations of above 92%. This is a degree of purity never before available, and, to mark the change, Armour has re-labeled the Neo-Fats. In the specification chart below, the old number, in parenthesis, follows the new. At the same time that purity standards have been raised, the iodine value has been lowered and the color has been lightened.

Ordinary distilled coconut oil fatty acids are mixtures of nine different fatty acids in percentages varying from 0.5% to 48%. Each of the nine component acids has its own specific chemical and physical properties which make it valuable for certain uses but unsatisfactory for others. Today, however, you are no longer forced to buy a mixture of nine different fatty acids to get the one you really want.

A new specification chart has just been prepared which includes all pertinent information on these versatile chemicals. Check the coupon for your free copy of this chart. In addition, get the Neo-Fat booklet for end-use information. This new booklet contains much valuable data on the Neo-Fat fatty acids and their use.

	Iodine		Acid Value		Titer, C.		Color, Lovibond 5¼"	Caproic	Caprylic	Capric	Lauric	Myristic	Palmitic
	Min.	Max.	Min.	Max.	Min.	Max.		%	%	%	%	%	%
Neo-Fat 8 (7) (caprylic acid)	—	1.0	387	392	—	16°	2 R-20 Y	3	93	4			
Neo-Fat 10 (9) (capric acid)	—	1.0	323	329	28°	33°	2 R-20 Y		3	92	5		
Neo-Fat 12 (11) (lauric acid)	—	1.0	278	282	41°	44°	1.0 R-10 Y			1	95	4	
Neo-Fat 14 (13) (myristic acid)	—	1.0	243	249	48°	52°	1.0 R-10 Y				3	94	3

NEW SOLVENT CRYSTALLIZED OLEIC ACIDS



Ester-free oleic acids are the result of a new Armour Chemical Division process which utilizes a solvent which does not react with the raw materials. This new process, combined with Armour's low temperature crystallization, assures you advantages not found in ordinary distilled or pressed oleic acids. The extremely low temperatures employed guarantee a substantially lower saturated fatty acid content than conventional types of oleic acids. These new products are characterized by bland odor and excellent heat stability.

Here are the 6 oleic acids: Low Titer Red Oil, 8-11° Red Oil, Saponified Red Oil, Low Titer White Oleic, 8-11° White Oleic, Commercially Pure Oleic.

All 6 of these acids are available in 55 gal. drums and 4,000 and 8,000 gallon aluminum tank cars. Send the coupon today for specifications and current price quotations.

FATTY ACIDS
LONG-CHAIN FATTY ACID DERIVATIVES
INDUSTRIAL OILS

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Check the items you need, fill in name and address, and mail today.

Send Samples: ☐ Arquad 2C ☐ Arquad S-2C ☐ Duomeen T ☐ Neo-Fat 12

Send Literature: ☐ Tech. Bul. E-6 ☐ "Asphalt Additives" ☐ Oleic Acids Specs. and prices ☐ Arneels booklet ☐ Duomeens booklet ☐ Neo-Fat Spec. chart ☐ "Fractionated Coco Oil Fatty Acids"

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clean as a whistle

Smooth—Stain-free—Spotless. There's nothing like a dip to brighten and improve the appearance. This applies not only to a four-year-old, but also to metal. For junior it's soap — for metal it's Mutual's Chromium Chemicals.

Leading brass manufacturers find a Sodium Bichromate dip, with sulfuric acid, to be the most effective treatment for removing stains resulting from annealing. A metal surface uniformly clean, bright and pleasing in appearance emerges from this bath.

Many other metal treatments employ Bichromate. Used on aluminum and magnesium it contributes to the development of corrosion-resistant films. Mixtures including Bichromate or Chromic Acid are used to form protective and paint-base coatings on iron, steel, zinc, cadmium, aluminum and magnesium.

Mutual's Research and Development Department has a wealth of technical data on the use of Chromium Chemicals in metal treatment.

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SODIUM CHROMATE
POTASSIUM BICHROMATE
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Mutual Chromium Chemicals

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NEWSLETTER

You'll hear more about the LeBaron-Lawver process. Unveiled just this week by International Minerals & Chemicals, it's an ore beneficiation technique that will be used first on potash—although it is applicable to phosphate and many other ores as well.

No water nor reagents are used. The ore is merely ground, dried, "given a simple and inexpensive treatment," and passed between electrodes which effect a separation.

IM&C has been operating a small pilot plant in Florida (on potash ore shipped in from Carlsbad, N.M.); it is now about to build a larger one at Carlsbad, and designs are almost complete for a full-scale plant. Patent applications have been filed on the process and equipment.

Growth of a market has dictated a process change at Hoberg Paper Mills (Green Bay, Wis.). The mill decided some years ago to dispose of its waste liquor by making yeast; but officials changed their minds when the neighboring Lake States Yeast Corp. (Rhinelander, Wis.), operating on Rhinelander Paper Co.'s wastes, had trouble selling all its output. Hoberg then decided to build a $1¼ million evaporator plant instead.

But now livestock feeders are more protein-conscious, yeast sales are up, and Hoberg will revert to its original idea, will make 4,500 tons a year (vs. Rhinelander's 2,000 tons) of yeast.

Rhinelander Paper Co., incidentally, is starting to build, will complete in February, a 40 tons-a-day semichemical pulp mill to handle aspen—about the most important wood in Wisconsin today.

Breathing easier after the election are the cooperatives (see p. 23). They foresee less pressure for taxation, since Daniel Reed, veteran (since 1918) Republican representative from upstate New York and ranking member of the Ways and Means Committee, is violently opposed to higher taxes on consumer-owned enterprises.

More federal money is pouring into research and development, but less is being channeled into fundamental studies, says the National Science Foundation. Non-profit institutions got $341 million in fiscal 1952—about 20% above last year; but a breakdown shows that basic research got only $71 million vs. $76 million in 1951.

Total spent on research by the federal government in government laboratories, industrial and non-profit institutions: over $2 billion.

And some of that research money isn't getting a cordial reception. The Air Force's new research office in Brussels (*CW* Newsletter, Oct. 18) has evoked Belgian resentment. The Belgians are peeved because none of the $225 million ticketed for "off-shore" research is going to them. Communists are making capital over it, saying the U. S. office is "another American control over our country and its industry . . ."

Replies the Air Force: The job of its new office is simply "to contract for basic and applied research and to monitor research and development contracts already established in Europe."

Everyone knows in a qualitative way that the chemical industry has been moving South; but now the Manufacturing Chemists' Association has some figures, based on a breakdown of DPA-granted certificates of necessity, that pin it down quantitatively. CW will publish the complete tabulation next week, but here are some highlights:

- Far and away ahead of the parade is the West South Central area (Ark., Okla., La., Tex.) with $706 million;
- The Great Lakes area (Ill., Wis. east to Ohio) comes next with $373 million in plant authorizations;
- Practically neck and neck with $298 million and $297 million respectively are the South Atlantic states (Md., W. Va. south to Fla.) and the Middle Atlantic area (N. Y., N. J., Pa.).

Research is also moving South, says the Southern Association of Science and Industry. Conceding that a decade ago there was not a single major consulting research institution in the South, the Association now points to 40 general consulting laboratories and about 25 commercial testing organizations—as well as over 200 individual consultants.

Moreover, 103 new laboratories or major research additions were established there during the past year.

It now appears likely that the National Research Council's Committee on Food Protection may modify its earlier stand on synthetic emulsifiers in bread to approve mono- and diglycerides.

A year ago the committee reported that "evidence at hand was not sufficient to establish safety of surface-active agents" in food.

Now a new report has been approved, will be released early next month. No official indication of its contents has been given, but those "in the know" believe that the Committee will give the glycerides a clean bill of health, will withhold approval of polyoxyethylene compounds. They base their belief on results of FDA research indicating non-toxicity of glycerides—evidence which the government has not used in hearings on the still-pending Atlas Powder case.

Soil conditioners have undergone a going-over by the U.S. Department of Agriculture—and have emerged with flags flying.

USDA says, as a result of preliminary, short-term tests, that "the best" among 28 products tested are "highly effective." The products included polyvinyls, polyacrylates, cellulose derivatives, lignin derivatives and silicates. The Department withheld brand names.

But the report contained some ifs and buts: Cost of treatment per acre (at rates advised by manufacturers) ranges from $200 to $3,000. Application by spraying—without mixing conditioner with soil—is always ineffective. Long-term tests are still necessary to determine how long usefulness of the compounds persists.

Ten Washington farmers are up in arms—suing Reynolds Metals Co. for $900,000 for damages alleged to result from pollution of the air by the firm's Longview plant. They contend that actual losses—vegetation destroyed and animals injured or killed—add up to $150,000. They're asking triple indemnity and an additional $450,000 punitive damages.

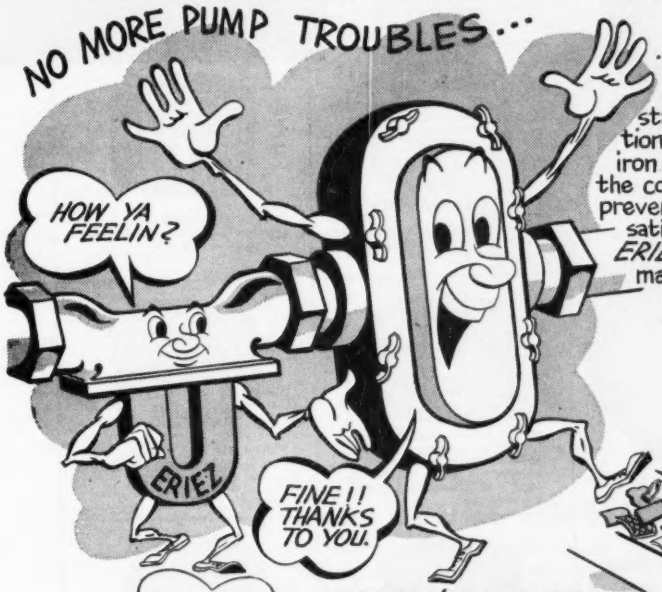
Have you ever seen one one-hundred-and-eightieth of an egg? It's a rather small amount, certainly, and that's why the Food and Drug Administration seized a shipment of Helene Curtis' shampoo advertised as "shampoo plus egg." Contended FDA: false and misleading labeling because of infinitesimal amount of egg.

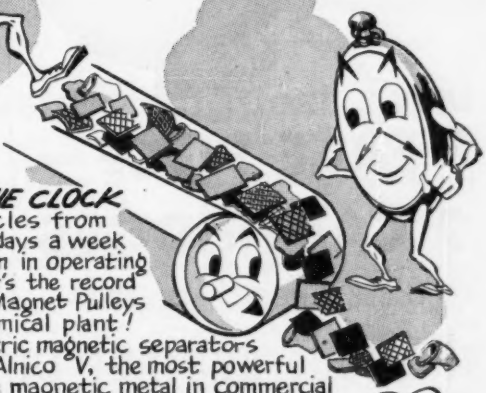
. . . The Editors

ERIEZ MANUFACTURING CO., ERIE, PA., U.S.A. • PRODUCERS OF MAGNETIC SEPARATORS

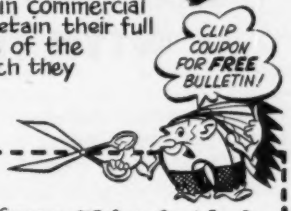
NO MORE PUMP TROUBLES...

...at the Mentholatum Co., Buffalo, N.Y., since an *ERIEZ* Magnetic Trap — faced with stainless steel for sanitary protection — was installed to prevent tramp iron damage to five pumps feeding the company's hot, free-flowing cold-preventive products. Here's another satisfied customer who says "The *ERIEZ* Magnetic Trap has so reduced maintenance and repair costs, as well as down-time, that operation without it would now be unthinkable!"





WORKING 'ROUND THE CLOCK taking ferrous particles from scrap rubber seven days a week without any reduction in operating efficiency... that's the record of 12 *ERIEZ* ATOMagnet Pulleys at a leading chemical plant! These non-electric magnetic separators are made of Alnico V, the most powerful and efficient magnetic metal in commercial use. They're guaranteed to retain their full magnetic power for the life of the chemical equipment on which they are installed!



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A new, big sixteen-page catalog gives complete engineering specifications, drawings, illustrations and descriptions of 25 different types of *ERIEZ* Magnetic Separators for use in the chemical industry. Get your copy today... It's FREE! Use the coupon at right.

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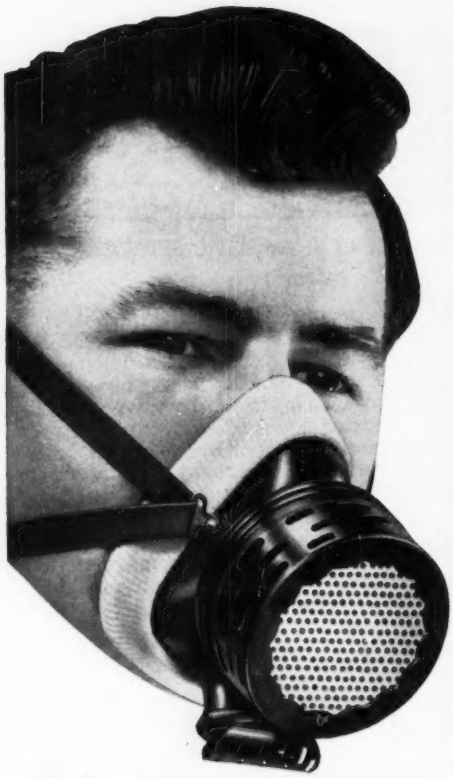

RESPIRATORY PROTECTION

*WITH **R31** CARTRIDGE — For low concentration of light organic vapors and gases in paint spraying, degreasing, dry cleaning, cementing, etc. Absorbs vapors of benzene, xylene, toluene, gasoline, naphtha, acetone, turpentine, etc.

*WITH **R32** CARTRIDGE — For low concentrations of acid gases, mists — sulphuric acid, hydrogen chloride, etc. Used in plating, pickling operations and similar.

*WITH **R15** CARTRIDGE — For nuisance and pneumoconiosis-producing dusts. (BM-2121)

*WITH **R33** CARTRIDGE — For low concentrations of combined acid and organic gases such as halogenated hydrocarbons, carbon tetrachloride, acetic acid. Protects in degreasing operations, etc.

*WITH **R16** CARTRIDGE — For toxic dusts not significantly more harmful than lead. (BM-2138)

*WITH **R34** CARTRIDGE—Protects against nuisance concentrations of ammonia.

*WITH **R17** CARTRIDGE—For all dusts not significantly more toxic than lead. (BM-2138)

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Protect against Dusts, Gases and Vapors

WITH THE AO R2000 RESPIRATOR

When a variety of hazardous vapors, gases or dusts are a problem, you can now simplify the protection and save money by standardizing on the AO R2000 Respirator. Its single, basic face piece accommodates four chemical cartridges of NON-SPARKING metal and three dust cartridges which, while light in weight for comfort, have maximum filtering capacity. CARTRIDGES INTERCHANGE WITH A TWIST OF THE WRIST—one twist removes outer cover, a second replaces it. Respirator may also be used with highly efficient, chemically-treated disposable dust filter.

QUICK RESPIRATOR FACTS

- Face mask molded from pliable rubber.
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- Inhalation valve of pure gum rubber freely admits air at lightest intake of breath, seals tightly on exhalation.
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BUSINESS & INDUSTRY . . . . . .

Aluminum Urgency

The urgency with which government officials view the need for aluminum expansion was evident last week. The Defense Production Administration gave Olin Industries a tax amortization certificate allowing the company to write off within five years 85% of the $123.3 million it plans to spend on aluminum production facilities.

Few certificates have had as high a write-off percentage. Few have had as large a dollar volume.

The certificate is the first to be issued under the expanded goal for aluminum production. In setting the mark, DPA extended a special invitation to producers not already in the field.

Olin plans to begin work on its 110,000 ton-per-year plant "almost immediately," though, if it has decided on the location of the facility, it is keeping mum about it. In addition to metal reduction facilities, the company plans to set up a sheet and extrusion plant.

Two to Center: Two other companies are also in the center of the aluminum spotlight. The Wheland Co., Chattanooga metal fabricator, is willing to spend $90 million on ore and reduction units capable of turning out about 75,000 tons of the metal yearly. It would build on the Tennessee River near Chattanooga.

Harvey Machine Co., the California firm with a long-time hankering to get into aluminum production, apparently feels that it was too junior a junior partner in the Anaconda Copper-Harvey plant scheduled for Kalispell, Mont. It now plans to go it alone on a $45 million plant near The Dalles, Ore., which would be capable of producing 45,000 tons per year.

Harvey would use bauxite from the Surinam Islands in the Caribbean Sea. Harvey also reports it holds firm power commitments for 80,000 kw plus commitments for an additional 60,000 kw of interruptible power.

Squabble Ahead: DPA, when it revised its goal, saw a need for 200,000 tons more metal. These three projects would account for 230,000, and DPA reports that "five to ten" other companies are interested in making it.

With Olin's the only project to have received dotted-line approval, there may be a squabble over who gets write-offs and construction permits on the 90,000 tons of capacity still to be filled.

WIDE WORLD

CHICAGO DEFENDANTS*: Sagacious enterprise or sinister conspiracy?

Trust-Busters' Biggest Trial

Du Pont, the world's largest chemical company and also the one that's most vexatiously enmeshed in anti-trust litigation†, is simmering in silence these days as government attorneys present their share of the voluminous evidence in the trial that started last week in U.S. District Court in Chicago.

After presenting trial briefs and opening statements that amounted to a vigorous denial of the government's monopoly charges, attorneys for Du Pont and co-defendants will be pretty much limited to cross-examinations and objections until their turn comes to introduce evidence—probably late in January.

Conspiracy Charged: Meanwhile, Willis L. Hotchkiss, chief of the Anti-trust Division's Midwest office, will be flooding the court with testimony and documents purporting to show that Du Pont, General Motors, U. S. Rubber and Du Pont's principal stockholders have been carrying out "a conspiracy to restrain and monopolize interstate commerce." Hotchkiss contends that the three big companies have violated the Sherman Act by agreements to buy each other's products in "a vast protected market." He wants the court to force Du Pont to dispose of its 23% of GM stock and to order members of the Du Pont family to sell their 18% of U. S. Rubber stock.

Waging a two-fisted fight to refute those accusations, the defendants have sent a squad of about 30 lawyers into the fray. Their opening statements and trial briefs made it plain that the defendants are out to win this suit, which Hotchkiss promised the opening-day spectators would "dwarf all previous anti-trust cases in its magnitude." He declared that "never in anti-trust history have so few persons had control over so much."

'Big Names' to Testify: Defense attorneys indicated that not only will they match the prosecution in written evidence, document for document, but they will put the companies' top officers on the witness stand to "assert,

* In earnest parley during a lull in proceedings are Irenee du Pont, a major stockholder in the Du Pont company; Walter S. Carpenter, chairman of the board; and Pierre du Pont, head of the Du Pont family and former board chairman.

† Du Pont's won-and-lost standing in the litigation league over the past two years: One victory (dismissal of indictment in paint, varnish and enamel case); one loss (court order to dissolve Du Pont-I.C.I. agreements and joint ownership of subsidiaries); two cases pending (Cellophane case and the Du Pont-G.M.-U.S. Rubber case); and two cases not yet come to trial (wood finishes case and brake fluid case).

under oath, that no such conspiracy ever existed."

Point-by-point arguments of the defense probably will run like this:

Christiana Securities Co., which the government claims was set up to further the alleged conspiracy, was organized in 1915 to obtain Du Pont stock for younger executives in the Du Pont firm and to assure the World War I Allies that Du Pont stock would not fall into pro-German hands.

Delaware Realty & Investment, also accused of being set up to control the alleged conspiracy, was formed in 1924 as "a perfectly proper, albeit somewhat novel, method of anticipating the transfer of most of Pierre du Pont's large holdings to his heirs."

First G.M. Investment: Du Pont's original investment of nearly $50 million in G.M. stock was recommended by J. J. Raskob, then treasurer of Du Pont, merely as a sound way to utilize that portion of World War I earnings that could not be readily used for further expansion of Du Pont. Further G.M. stock purchases were only temporary measures to bolster G.M.'s financial status.

Pierre du Pont "reluctantly" became G.M. president in 1921 because the preceding president, W. C. Durant, had become "discredited with the financial community," and G.M. needed "a man of unquestioned integrity and unqualified success" to restore confidence in G.M. and avoid a receivership.

G.M. bonus plans, attacked by the government as a plot to "bribe" G.M. executives to be subservient to Du Pont, were approved by U. S. District Court in New York in 1942 as having been planned "to promote the interests of the stockholders."

Duco Scores Hit: G.M.'s purchases of Du Pont auto finishes, attributed by the government to Du Pont's position as a powerful stockholder, was due to the quality of Du Pont products —particularly that of Duco, the low-viscosity nitrocellulose lacquer discovered by Du Pont chemists in 1920, and which by 1925 had been adopted by most U.S. auto manufacturers as a topcoat lacquer.

(Trying to show that G.M. has been free to buy whatever products it wanted to, the Du Pont attorneys relate: "Whereas continued Du Pont superiority in the case of Duco topcoats has resulted in its retaining a sales position with G.M. in that product, an absence of superiority over the specialty producers of rubbing compounds has had the opposite effect; Du Pont now has lost that business almost in its entirety.")

In fabrics, plastics materials, safety glass and brake fluid, G.M. has bought or refused Du Pont products as G.M. production and purchasing leaders saw fit.

Yen for Chevvies: Du Pont has preferred to buy G.M. cars and trucks, and particularly those of Chevrolet make, defense attorneys admit —"a preference that Du Pont shares with millions." But they insist that "the entire volume of such purchases is totally insignificant."

Instead of being "ruled" by Du Pont, as the government avows, G.M. turned down Du Pont suggestions on assignment of chemical research to Du Pont and on procedure for manufacture of tetraethyl lead. The Ethyl Corp., owned 50-50 by G.M. and Standard Oil of New Jersey, has operated independent of Du Pont control. ("Since 1947," defense attorneys recount, "both Du Pont and Ethyl have manufactured tetraethyl lead in spirited competition with each other. Ethyl had a substantial initial advantage and still has more of the market than Du Pont. Aggressive salesmanship and service, however, have enabled Du Pont to make constantly increasing inroads into Ethyl's customers.")

No Reciprocity: In equally emphatic language, defense attorneys deny that Du Pont used G.M. purchases as a "reciprocity club" to force G.M.'s suppliers to buy from Du Pont. They say that neither Du Pont or G.M. resources were used to finance expansion by the other; in fact, Du Pont's steady policy has been to pay out to its stockholders all dividends it receives on G.M. stock.

Irenee du Pont first invested in U.S. Rubber in 1913, and suggested a syndicate to buy enough additional U.S. Rubber stock to make "a lawful and legitimate improvement in management" of that company. However, he could not have had in mind "a captive market" with G.M., the defense maintains, because he urged that U.S. Rubber abandon its tire business.

Du Pont now sells in large volume to U.S. Rubber, chiefly high-tenacity rayon for tires, the defense attorneys concede. But U. S. Rubber buys more than half of its needs from Du Pont competitors, and Du Pont sells more rayon to rubber competitors than it does to U.S. Rubber itself.

COMPANIES . . . .

Company acquisitions were in the news this week.

• Mathieson Chemical Corp. has acquired the assets and facilities of Activated Alum Corp. and Activated Alum Sales Corp., manufacturers of aluminum sulfate. Activated Alum's plant, located adjacent to Mathieson's Curtis Bay, Baltimore, Md. operations, has received its entire sulfuric acid requirements from Mathieson.

• A chemical plant formerly occupied by Steroid Laboratories at Grenville, P.Q., Canada, has been acquired by Gallowhur Chemical Co. The plant will manufacture quaternary ammonium compounds and organic mercurials.

•

Company financial news includes two stock sales and one promissory note transaction.

• Plant expansion and working capital will consume approximately $1.7 million raised from the sale of 370,000 shares of Smith-Douglass Co. common stock.

• Davison Chemical Corp. will offer early in December 160,666 shares of common stock to its stockholders on the basis of one new share for each four held. The proceeds, approximately $5 million, will be used to continue Davison's expansion plans.

• H. K. Porter Co., Inc., Pittsburgh industrial equipment manufacturer, has placed $8 million of promissory notes, due November 1, 1967. About $4.5 million of bank loans will be repaid from part of the proceeds.

•

A consolidation of The Matheson Company, Inc. of East Rutherford, N.J., and The Coleman & Bell Co. of Norwood, O. has taken place with the purchase of all of Coleman & Bell's outstanding capital stock by Matheson. The two companies will incorporate their products into one complete line, and headquarters of Matheson will be moved to Norwood. Coleman & Bell will continue operations under the name of Matheson Coleman and Bell, Inc.

•

Walter Kidde Nuclear Laboratories has established an advisory committee consisting of two scientists and an economist. The purpose of the committee will be to consult with the management of Walter Kidde on long-range planning for commercial atomic power development and on the application of nuclear technology to industrial problems.

•

For tax reasons, Food Machinery and Chemical and National Distillers Corp. have changed the corporate structure of their subsidiary, Intermountain Chemical Corp. Intermountain, instead of being a corporate subsidiary, will be managed on a partnership basis. Operating policies will not be changed.

Financial Planning at Monsanto means

Using Return on Investment as yardstick to evaluate

- *Performance of company, each operating division and subsidiary*
- *Individual projects*
- *Proposed expansions*

and Forecasting Cash Position at end of each month 24 months in advance to make possible a

Financing Program that assures

- *Sufficient cash on hand to finance expansion and add working capital before major projects are started*
- *The most advantageous type of financing for the amount of money needed at a given time*

Portrait of the Week

It's not often that the financial operations of any big company are virtually X-rayed in public. But last Friday executives in general, and chemical industry men in particular, who stand to learn much by such an examination, had the chance of their business lives.

The occasion: The Financial Conference of the American Management Association at New York's Hotel Roosevelt.

The company: Monsanto Chemical Co., whose Daniel M. Sheehan, vice president and comptroller, and six staff members took a whole morning session to draw a detailed picture of the operations and techniques that make up its financial division.

Basically the Monsanto setup is simply a matter of determining how much money the company needs to carry out operations that will net its stockholders the best return on their investment, and then seeing that the cash is on hand before it is needed.

To achieve its objective, however, the company has a system of rigorous accounting controls—of budgeting and production cost—and techniques to gather and disseminate such corporate information to management.

Charts and graphs are used extensively to save executives time in understanding financial data and to bring out changes in operations and trends. The company has also established an accounting research group to speed up service on necessary reports; partial "electronization" of procedures, which has come out of this move, has been a big factor in getting reports out fast.

Comparable Basis: Yardstick for judging the success of all company operations and the feasibility of proposed activities is percentage return on investment rather than return on net worth. Investment is calculated as gross assets less current liabilities, pension reserve, employee bonus and minority interest of subsidiary companies; depreciation reserve is not deducted from gross asset value of property. (Certain adjustments in capital investment eliminate large excess cash and securities balances and cost of fixed assets for major projects not yet operating.) Net income is income resulting after all costs and expenses.

Such a concept of return on investment, Monsanto feels, gives a comparable measure of company activity regardless of changes in its fiscal program, special reserves it may establish, or changes in depreciation policies.

To plan a program of financing that will maintain maximum return on investment, the comptroller's office sees that the finance committee is informed each month of the company's estimated monthly cash position two years in advance. This cash forecast is the sum of future earnings and disbursements estimated by all responsible executives for each phase of operations.

Having this long-range estimate enables the company to plan intelligently for additional funds that may be required at some future date. When such a need appears, the finance committee reviews planned expenditures, and if it finds them justified, determines the amount of new financing necessary. Then it decides on what kind of securities to issue and the best time to issue them.

From All Angles: Among considerations are keeping a proper balance between capital stock and debt, the

desirability of an increase in permanent debt or in long-term debt, the marketability of types of securities at a given time, and effect of the type of financing on taxes.

The tax situation has had much influence on such a decision because the excess profits tax can make it possible for a company to make a profit by borrowing money. Monsanto offers itself as a case in point: When it sold $66 million of 3¾% income debentures and $38 million of common stock earlier this year, the cash saving on the two financings was $1,148,000.

Hewing the Line: Key factor in such forecasting and planning is budgeting, which also provides a basis for control. For through forecasts and budget control, the company's executive committee has an agreement with executives responsible for each phase of the budget as to what they are expected to do, and a means of checking up on their performance.

Controls for comparisons with actual operations include budgets for income; sales, costs of good sold and gross profits by products; earnings on new or expanded facilities; construction and replacement expenditures; and estimated cash position.

In controlling production cost, basic standards are developed from information obtained from production supervisors in charge of individual departments. Since in chemical manufacture expenses going into the cost of a product vary with changes in production level—but not necessarily to the same degree—Monsanto uses "multiple brackets" to set standard costs. These levels represent points at which some significant change in cost occurs.

Thus variance from standard production costs can be broken down into three categories: performance, price and volume. Performance is the concern of the production supervisor since it reflects his operation's efficiency; but prices are beyond his control. And volume variance shows how effectively plant capacity is being used, hence is the concern of the division superintendent.

Keeping Tabs: Basic to close control of the company's operations is an efficient accounting system that collects pertinent data and interprets them for management. In large measure because of the use of electronic machines in accounting, reports on the previous month's performance are available on the fifth of the month. Many charts and graphs point out weak and strong spots and important trends in current operations conserving executives' time and enabling them to act promptly on the information.

LEGAL . . . . . .

Ask Patent Annulment: Rohm & Haas Co. and Lee Plastics, both of Philadelphia, are asking the Federal Court in that city to declare invalid a patent on an invention in ethylenic-alpha-beta synthetic resins. This request is in the two companies' reply to the civil suit filed several months ago (*CW, Sept. 27*) by Ellis-Foster Co., Montclair, N. J., holder of the patent. The defendants deny the charge that they have been infringing the patent, and ask for an injunction to keep Ellis-Foster from further legal action. Also, say Lee Plastics and Rohm & Haas, since the patent was issued 11 years ago, Ellis-Foster shouldn't have waited so long to file its charges.

•

Cross-Country Suit: Two drug manufacturing companies in Buffalo, N. Y., are appealing to the U. S. Supreme Court in what looks like the last round of a law scrimmage that was started two years ago by John Fielding, Jr., of San Francisco. The companies, Westwood Pharmacal and Foster-Milburn, contend that they aren't in business in California, but that the Los Angeles company that wholesales their products in that state is "an independent merchant." They want the Supreme Court to reverse a decision of the California Court of Appeals directing the San Francisco Superior Court to take jurisdiction in the case. The state appeals court said the case involves essentially the same facts as an earlier suit in which a California resident sued for personal injuries allegedly resulting from use of pharmaceuticals manufactured in New York.

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Court OK's Fluoride: A city ordinance permitting the addition of fluoride to the drinking water in Chehalis, Wash., has been upheld in Lewis County Superior Court. Judge John E. Murray ruled against Arthur Kaul, who earlier had obtained a restrainer on his charge that the project "makes the city a water-delivery boy for medicine."

•

Incentive Plan Wins: Superior Court Judge Walter J. Freund of New Jersey has affirmed the incentive stock option plan that Standard Oil (New Jersey) adopted last year to reward 80 executives. The plan was approved by 97% of the stockholders represented at the meeting at which the plan was adopted, but one stockholder, Jay Eliasberg, filed suit to prevent Esso from carrying out the plan. Judge Freund ruled that the plan had been legally ratified by the stockholders and that Eliasberg had failed to prove the plan unfair.

EXPANSION . . . .

Polyester Film: Circleville, O., will be the site of a $10 million plant to be constructed by Du Pont. The plant will produce Mylar polyester film. Construction starts this spring.

•

Maleic Anhydride: National Aniline Division of Allied Chemical & Dye Corp. will begin construction of a $4½ million plant to be located south of Moundsville, W.Va. The plant will produce maleic anhydride and fumaric acid.

•

Synthetic Rubber: Goodyear Tire & Rubber Co. plans a $1.5 million expansion at its present Akron, O. facilities for the production of Chemigum synthetic rubber.

•

Petroleum Refining: Phillips Petroleum Co.'s new $10 million catalytic cracking plant at Woods Cross, Utah, has been completed. The new unit will increase the company's run of crude oil stills to more than twice their former production.

• Socony-Vacuum Oil Co.'s West Coast affiliate, General Petroleum Co., has awarded a contract for the construction of a Thermofor catalytic reformer to Bechtel Corp. The new reformer will be located at the Company's Torrance, Calif. refinery, and will produce 1,900 barrels daily.

•

Styrene: The ground has been broken for Foster Grant Co.'s new styrene plant at Orange, Tex.

•

Carbon Bisulfide: Stauffer Chemical Co.'s new carbon bisulfide plant at Le Moyne, Ala., has been completed.

DPA's LATEST TAX WRITE-OFF LIST

Company, Location	Product	Amount Certified	% Certified
Simpson Coal & Chemical, Caruthersville, Mo.	Phosphoric acid	$1,915,900	45
	Uranium recovery	468,000	75
Climax Uranium, Grand Junction, Colo.	Uranium	283,253	80
Magnet Cove Barium Corp., New Orleans, La.	Barium sulfate	423,500	30
National Steel, Weirton, W.Va.	Coke, coal tar chemicals	24,750,000	60
Dow Chemical, Freeport, Tex.	Ethylene dibromide	8,455,000	80
American Cyanamid, Bound Brook, N.J.	Naphthalene	857,000	60
Esso Standard Oil, Baton Rouge, La.	Petroleum resin	2,800,000	45
Commercial Solvents, Terre Haute, Ind.	Bacitracin	26,450	55

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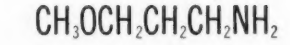
3-Isopropoxypropylamine



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How they're Taxed

FERTILIZER PLANT INVESTMENT

	Corporation	Co-operative
Let's say you build a 100,000 ton/year triple superphosphate plant. You invest	$2,700,000	$2,700,000
Assuming a 20% pre-tax return, you gross	540,000	540,000
You want to give stockholders/members a dividend on investment totalling	100,000	100,000
Taxes* on such a dividend would amount to	100,000	none
So you must set aside a total of	200,000	100,000
This leaves you	340,000	440,000
Subtracting taxes* the net business return is	170,000	220,000

* 50% tax level assumed

Co op advantage $50,000

Toward a Balance

Misanthropes who like to read the Federal Register, and executives who have to read it, a few days ago found out that the Bureau of Internal Revenue was ready to change its rules for taxing exempt cooperatives.

The proposed changes—all 88 column inches of them—implement the part of the Revenue Act of 1951 which, for the first time, taxes the unallocated reserves of exempt cooperatives. Congress, in approving this portion of the act, apparently reflected an attitude in business and among consumers that agriculture in general, and co-ops in particular, were privileged too long.

Many makers of fertilizers and agricultural chemicals have been noting a trend among co-ops to move from merely selling such products to integrated operations: from mining and extraction to manufacture, and from manufacture to distribution and sales. To them, any move to extend taxation of co-ops—if it would curb some expansion—couldn't come too soon. While it isn't seriously crimping present "private" wholesale operations, it could do so in the future.

Whether any strict limitation has really been put on cooperatives is debatable. But there is no question as to the trend to integration.

Back in 1951, about 100 cooperatives operated mixing plants, and 15 had units for making normal superphosphates. Since then, the number of mixing units has stayed about the same, though some small plants have been replaced by larger ones. The number of superphosphate units, though, went up to about 20.

At present, the government's Farm Credit Administration, which prepares statistics on cooperatives, knows of no triple superphosphate manufacture by a co-op. But plans now under consideration could change this picture.

- The Missouri Farmers Association will build a $3.5 million phosphoric acid, triple superphosphate and ammonium phosphate facility at Galena, Kans. MFA also plans to spend over $1 million on phosphoric acid and triple superphosphate units near Garfield, Utah.
- Associated Cooperatives plans a $2 million plant at Sheffield, Ala., to produce nitro-phosphatic fertilizers via TVA processes.
- Pacific Supply Co-op and Central Farmers Fertilizer Co. want to spend $30 million to produce triple super via elemental phosphorus. Power would come from the proposed Hells Canyon (Idaho) dam. The groups feel that it could produce 275,000 tons per year and save $5 million on present costs.

Phosphate rock for such operation would come from a deposit near Montpelier, Idaho, purchased in 1947 by the 15 co-ops making up Central Farmers Fertilizer.

- The National Farmers Union Service Co. has plans to use its phosphate deposits in the Crawford Mountain area of Utah to turn out 100,000 tons of triple super per year. It would have to buy sulfuric, since power for producing elemental phosphorus is not available there. NFUSC feels that the present freight structure makes feasible distribution to all states west of the Mississippi and Illinois and Wisconsin. (Not all cooperative people, however, agree on this point.)
- Farmers Union, also, has optioned potash beds near Carlsbad, N.M., which it says are commercially mineable. Capital for both the phosphate and potash operations will come from profits of the Farmers Union life and auto insurance companies.
- Consumers Cooperative Association plans a $16 million nitrate fertilizer plant at Lawrence, Kas. It planned to get a $10 million government loan, raise $6 million from members. CCA, turned down on the loan, has obtained over $7 million from farmers, will raise the rest on a bank loan. Products are to be solid ammonium nitrate and ammonia dissolved in an aqueous ammo nitrate solution.
- Mississippi Chemical Co., a cooperative group, plans a new ammonia and ammonium nitrate plant at Yazoo City. It is selling a total of $10 million worth of stock. Each share will entitle the purchaser to a certain poundage of ammonia or the nitrate.

Success on these ventures would be only a beginning of a trend that could bite into company profits.

The Tax Question: Undoubtedly one of the most misunderstood aspects of cooperative-corporate relations is the matter of taxes. In the chart (*above*), CW presents a comparison of taxes under the latest tax laws. Assumed, on the corporate side, is a return to stockholders of 3.7% on investment. For comparison, a similar amount (18.5% of gross profit) was set aside for cooperative rebates. This is far too low, according to a study made in Minnesota. Co-ops there distributed 18% in cash, but also gave out 73% more in the form of stock, revolving fund certificates, or other allocated reserves. On this basis, the advantage of a co-op would be far greater. Instead of paying taxes of $220,000, it would pay $24,300; the corporation,

West Coast Suburbanization

EASTERN COMPANIES aren't the only ones finding operations more peaceful and profitable in the country (*CW, Aug. 23*). Latest to make the move is Rietz Manufacturing Co., formerly of San Francisco, now in Santa Rosa, Calif., Rietz, a leading manufacturer of special size reduction equipment, just held "open house" at its 50-acre "industrial campus" (*right*), a far cry from its congested plant (*left*) in the heart of San Francisco. The shift, which cost $185,000, met with employee approval: All 35 with the company at the time of the re-location moved with it the 56 miles to the north.

Factors considered by the company in making the change included 1) the increasing congestion of the Bay Area; 2) the desire to achieve a more efficient plant layout of the one-story type; and 3) concern for the health, morale and increased productivity of employees. The company found that labor-management relations existing in Santa Rosa are as good as those anywhere on the West Coast. Local strikes are practically unknown, and the ideal living conditions in the area attract a steady supply of skilled craftsmen. Furthermore, several good plant sites are available at low cost.

During the past 16 months almost two dozen plants have been established in the Santa Rosa area, some of the moves motivated as much by atom bomb considerations as by congestion in metropolitan areas.

$270,000. Net advantage would be $256,700, instead of $50,000.

At present, cooperatives are not as efficient as businesses, so such an advantage is not realistic. For a businessman who comes into competition with a cooperative, though, there's worry ahead if co-op efficiency climbs as as high as a corporation's.

LABOR . . . . . .

New Pension Plan: Topping this week's flock of company-labor agreements in the chemical processing industries is the report of a new retirement program for employees at the Neodesha, Kan., plant of Archer-Daniels-Midland. If this plan is approved by WSB and the Bureau of Internal Revenue, it will provide monthly payments of up to $125 for employees who retire at age 65 with at least 15 years' service; or up to $150 for employees who work beyond age 65. Company will pay entire cost.

• At Birmingham, Ala., a 5¢/hour boost retroactive to last June 3 will be paid to 42 International Chemical Workers Union (AFL) members at the Linde Air Products plant under a new contract approved by WSB.

• The approximately 2,000 hourly-paid employees of E. R. Squibb & Sons in New Brunswick, N.J., will get an additional 4¢/hour from August 1951 to August 1952, and then an 8¢ hike for the current period. This is the first contract at this plant since United Gas, Coke & Chemical Workers (CIO) won the bargaining agency there several months ago.

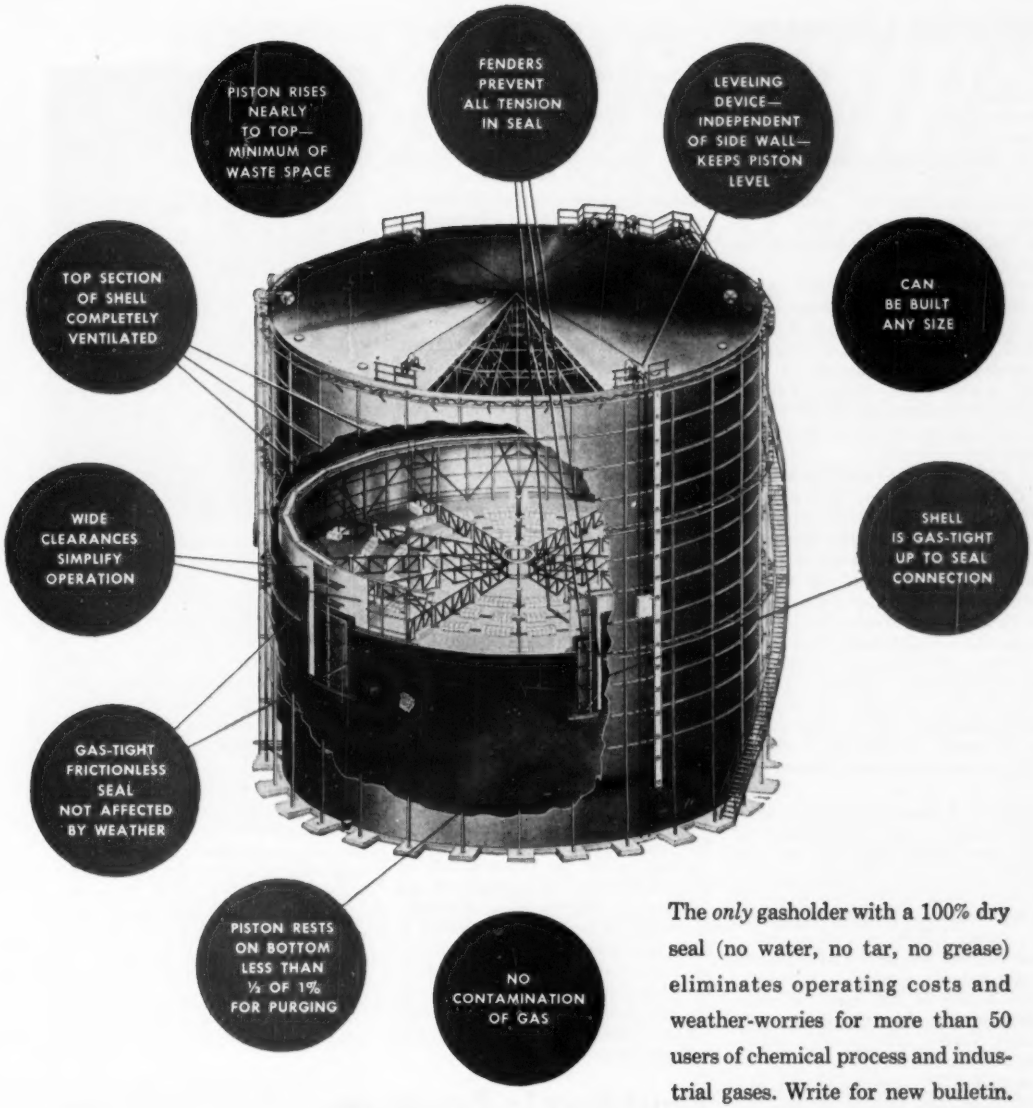
• Wage increases that will total about $600,000 a year are stipulated in a new agreement between American Enka Corp. and the AFL Textile Workers Union. The 6¢/hour rise will go not only to union members at the plant in Enka, N.C., but also to employees at the plant in Lowland, Tenn., who are not represented by the union. The company also is increasing all weekly and bi-weekly salaries at both plants.

• Adelphi Paint & Color Works, Ozone Park, N.Y., has granted a 7½¢/hour wage rise to employees earning less than $56 a week and a 5¢ increase to those who are earning more than that figure. The employees, who are members of Gas-Coke, also are offered paid-up life insurance upon retirement after 15 years' continuous service.

• A 2¢/hour wage boost retroactive to Sept. 25 has been approved by WSB for 37 United Packinghouse Workers (CIO) members at the Armour Fertilizer Works in Birmingham, Ala.

• CIO Textile Workers Union and Celanese have signed a two-year agreement calling for wage increases ranging from 3¢ to 11¢/hour for 600 employees at Newark, N.J. The contract also provides for two wage reopening dates and a three-week vacation after 15 years' service. The CIO union ousted its AFL rival from this plant in a bargaining election last month.

• WSB has bestowed its blessing on a 4¢/hour pay increase for 166 factory employees and a $15/month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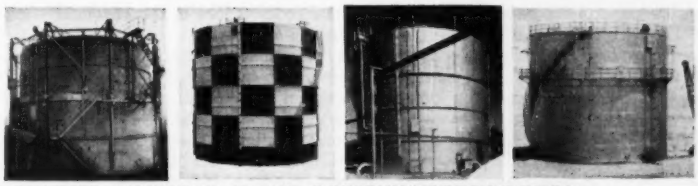

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hike for 91 office workers in the Bloomfield, N.J., plant of Prince Matchabelli Co., a subsidiary of Vick Chemical.

• Four hundred employees of Johnson & Johnson's Industrial Tape Co. in New Brunswick, N.J., will receive wage increases ranging from 3¢ to 6¢/hour under a new contract approved by WSB.

• Hourly wages will climb by 5¢ to 10¢ at five mills of St. Regis Paper Co. in northern New York if WSB okays the new contracts covering an estimated 1,700 employees in four AFL unions—Paper Makers, Pulp & Sulfite Workers, Firemen & Oilers, and Machinists. Increases are to be retroactive to Oct. 5.

• Pulp and paper employees north of the border also are in line for a 10¢/hour wage rise, which will hoist their basic pay rate to a new high of $1.50/hour. This agreement, covering some 5,000 employees, was worked out between five major companies in British Columbia (Alaska Pine & Cellulose, MacMillan-Bloedel, Powell River Paper, Howe Sound Pulp, and Pacific Mills) and two AFL unions (Pulp, Sulfite & Paper Mill Workers and International Brotherhood of Paper Workers). Workers also will receive a new cost-of-living bonus.

•

Unions vs. Unions: Number one item in the union elections department is that hourly-paid employees at the Atomic Energy Commission's gaseous diffusion plant in Paducah, Ky., will be represented by a union, but a run-off election will be needed to determine whether it'll be the AFL Atomic Trades & Labor Council or CIO Gas-Coke. Voting in last week's election came out like this: Gas-Coke, 207; Atomic Trades, 200; neither union, 152.

• At the U.S. methanol and formaldehyde plant in Morgantown, W. Va., which is operated by Mathieson, the NLRB is directing that carpenters and material fabricators be given another chance to choose a union as their bargaining agent. In the election held in September, 22 such workers were included in the general bargaining unit with production workers; the board now holds that the carpenters and material fabricators "may constitute (two) separate bargaining units if they so desire." No union received a majority of votes in the September election.

• ICWU has won two plant elections recently. One was at the Staten Island, N.Y., plant of Octagon Process Co., Inc. In the other, ICWU defeated UMW District 50 at the Canadian Industries, Ltd., plant near Calgary, Alberta.

• District 50, in turn, can boast of triumph in two other Canadian elections, both conducted by the Province of Ontario Labor Department. In the Reichhold plant election, District 50 had a clear field; but at Flintkote Co. of Canada, District 50 had to buck the AFL Pulp, Sulfite & Paper Mill Workers.

•

Employment Rising: The downward trend in chemical employment that started last March seems to be over. Total number of employees in chemical and allied products mounted to 747,000 in September, an increase of 8,000 workers from the year's low in June. The latest report by the Bureau of Labor Statistics shows that almost all of the gain has been in industrial organic chemicals, where employment stands at 234,000.

• Another BLS report this week shows that despite a wave of lay-offs in the synthetic fibers business, the chemical industry still had a lower rate of personnel turn-over in September than most other manufacturing industries. The comparison: for chemical industry, 3.5 separations per 100 employees; for all manufacturing, 4.8 per 100.

•

Friction Down South: At New Iberia, La., sheriff's deputies have been regularly searching autos and trucks going into and out of the Jefferson Salt Co. plant and confiscating weapons found in them. Several revolvers, shot guns, knives and a bayonet are reported to have been taken. ICWU members are on strike, but some employees have been going to work. At least two workers have said their autos were damaged by explosions, presumably to discourage them from working.

Doubling In Brass

Technical men who also have a flair for administrative work—doubling in brass, to borrow a band players' phrase—are numerous enough to comprise an important source of personnel for top-management jobs in the chemical processing industries.

This was the theme of Raymond Stevens, one of three speakers in a symposium on "The Human Side of Management" at the New York Chemists Club last week. Other orators: Arthur J. Slade, partner in Rogers, Slade & Hill (management consultants), New York; and Sidney D. Kirkpatrick, editorial director of CHEMICAL WEEK and *Chemical Engineering*.

STEVENS: No scarcity of prodigies.

Stevens, vice-president of Arthur D. Little, Inc., takes issue with New York University Professor Peter F. Drucker's thesis that most scientific and professional people are not suitable for, or happy in, administrative work; and that the exceptions are so rare that "to look for them is simply wasting time."

Four Make the Grade: Technically-trained men are proving themselves in managerial posts right now, Stevens maintains, citing such instances as those of H. B. McClure, vice-president of Carbide & Carbon; Charles A. Thomas, president of Monsanto; Robert B. Semple, president of Wyandotte; and Crawford H. Greenewalt, president of Du Pont. He predicts that to an increasing extent, chemical companies will utilize technical personnel for administrative tasks.

Recalling an old-timer chemical tycoon who felt that managerial responsibilities extended no farther than the profit-and-loss statement, Kirkpatrick urged that management seek to improve two "blind spots" in its daily chores: human communications (ability to express oneself) and human relations (ability to deal with people). He asserted that employees' emotional needs are as real and important as their material needs.

Training young people for future executive work is one of the advantages of using the "consultative" system of management, according to Slade. He said this system was more difficult and required better balanced leadership than other systems, but that it would pay off in better management, present and future.

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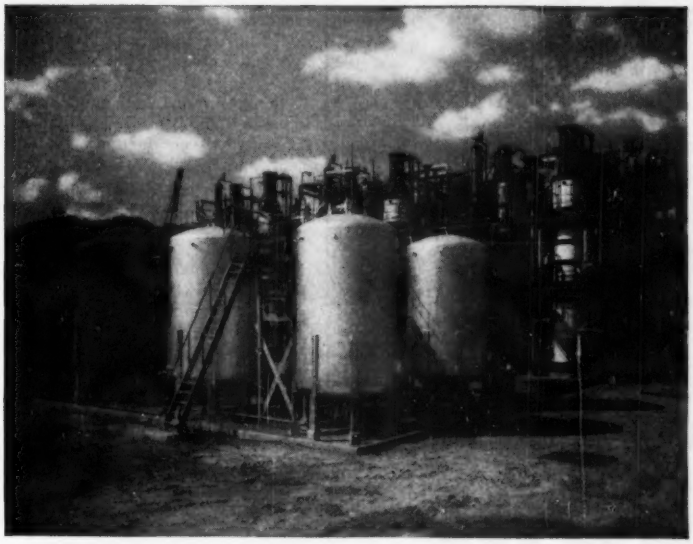

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FOREIGN . . . . .

Cellulose Acetate/Spain: The Transformadora Iberica de Plasticos, organized in 1947 for the manufacture of cellulose acetate for plastics, is being reorganized under the name of Interplastica. A fourfold increase in capital will make the firm the largest plastics manufacturer in Spain.

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Switzerland/Mexico: Switzerland has broadened chemical sales to Mexico. It sold 9 million pesos' worth of coal-tar dyes and 5 million of pharmaceuticals.

•

Titanium/Britain: Imperial Chemical Industries will erect pilot plants in Britain for the production of titanium metal and its alloys. This will make Britain the third country, after Canada and the U.S., to produce pure titanium.

•

DDT/Indonesia: The Ahasi Glass Co. in Tokyo will send material and engineers to construct a $3.6 million plant for the production of DDT, caustic soda and calcium chloride. The plant will be run by the Indonesian government and will produce 300 tons of caustic soda monthly.

•

Urea/Japan: The urea plant designed and engineered by the Chemical Construction Corp. for Sumitomo Chemical Co., Ltd., is now in operation at Niihama, Japan. Chemico plans to expand the plant to triple capacity for producing both plastic and fertilizer grades of urea.

KEY CHANGES . .

Parker S. Dunn: To vice-president, production, American Potash & Chemical Corp., Trona, Calif.

W. E. Santoro: To head, research division, Monroe Sander Corp., Long Island City, N.Y.

KUDOS. . . . . .

Edward Mallinckrodt, Jr.: Chairman of the board, Mallinckrodt Chemical Works, the 1952 Midwest Award of the American Chemical Society's St. Louis Section, Nov. 8.

John C. Warner: President, Carnegie Institute of Technology, Gold Medal of The American Institute of Chemists for 1953, to be awarded May 12.

DIED. . . . . .

Russell F. Roeller: General Sales Manager, Pennsylvania Salt Manufacturing Co., director, Chlorine Institute, Phoenixville, Pa., Nov. 12.

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CW Report

Phthalocyanines: Pigment Prodigies

In one short decade, annual production of phthalocyanine pigments has skyrocketed from 10,000 pounds to almost 1.8 million pounds.

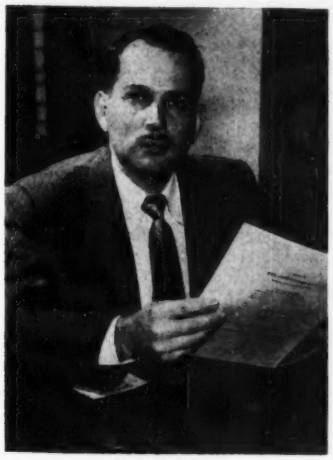
Here's the story on manufacturers, processes, products, outlets —a profile of this still-expanding branch of the pigment industry.

by Aaron Permut

Phthalocyanine pigments have been riding a steadily increasing wave of popularity in recent years; the growth of the field during the past decade has been remarkable. And for good reasons: The unusual lightfastness and chemical resistance of the phthalocyanines coupled with their high-tinctorial strength, heat-resistance and cleanliness of hue has filled a sore need in the pigment industry. But, as is so often the case, rapid growth has given rise to problems:

Pigment manufacturers have been hard-pressed to keep abreast of fast-moving market developments; and the profusion of new products, technical data and new names in the field has made a headache of the selection of the best phthalocyanine product for a particular application.

In 1942, phthalocyanine blue meant just one thing—a crystallizing red-shade, non-resinated, dry blue color. Today it covers a prolific family of processed pigments and dispersions. This report is intended to bring the record on these versatile pigments up to date. It is aimed at formulators who have been snowed under by voluminous, and sometimes confusing, trade literature.



THE AUTHOR

AARON PERMUT, whose professional concern centers on the development of new pigments and flushed inks, is research director of Sun Chemical Corp.'s Pigments Div. Since Sun Chemical Corp. manufactures paints, textile inks, plastics coatings and printing inks—as well as the pigments for these products—his work brings him into intimate contact with both the producing and consuming ends of the pigments business.

EARLY HURDLES

Recorded history of the phthalocyanines can be traced back only 25 years. In 1927 a paper was published in Switzerland (Helv. Chim. Acta.) by de Diesbach and von der Weid describing a bluish compound that resulted when an attempt was made to prepare phthalonitrile from o-dibromobenzene and cuprous cyanide. The pair reasoned that complex metallic salts of aromatic dinitriles, containing copper and pyridine, were responsible for the coloration.

Independently, researchers of Scottish Dyes, Ltd. were trying to track down the cause of discolored batches of phthalimide. A bluish substance formed where the reactants contacted iron in a flaw of the enamel lining of the reaction vessel. In 1929, Dandridge, Drescher and Thomas were awarded British patent 322,169 (assigned to Scottish Dyes, Ltd.) for insoluble organic compounds prepared by the action of ammonia on phthalic anhydride, phthalimide or phthalamide in the presence of iron, nickel and copper salts.

The nature of these new pigments remained a mystery until R. P. Linstead, of London's Imperial Institute of Science and Technology, and colleagues published, in 1934, the results of years of diligent research. They established the molecular structure of the complex pigments, named them "phthalocyanines." Linstead's phthalocyanine may be described structurally as tetrabenzoporphyrazine. In the copper salt, for example, the metal is held in a complex with four nitrogen atoms.

Commercial debut of copper phthalocyanine came in 1935 when Monastral Blue was introduced in England by Imperial Chemical Industries. Production in this country began the following year. Soon thereafter, the chemical pigments industry was taking an active interest in the new addition to its fold. As research gathered momentum, a host of patents covering reactants, precipitating conditions, anti-flocculants, anti-crystallants and surface active agents for the production of the new pigments were issued. All were aimed at the manufacture of a readily usable pigment from a horny, crystalline, chemically-resistant, low-color material. Potential field of application of the new class of pigments was expanded considerably with the discovery that chlorination yields a green material similar, physically, to the blue.

The first phthalocyanine pigments were extremely gritty, and even today they are not considered the easiest pigments to grind. To ease formulation problems, consumers turned to various forms of dispersion. Flushing in oils and varnishes as well as dispersing in solid resins overcame grinding difficulties for the paint, lacquer and printing inks people. The development of water-dispersible pastes and powders smoothed the way for wall-paper, latex-paint and poster-color application.

Another problem that beset the paint and lacquer trade was the tend-

ency of phthalocyanine blue to crystallize in the presence of strong aromatic solvents. Resulting loss of tinting strength was a serious threat to the future of the pigment in protective coatings. Tip-off to the eventual solution of this puzzle was the observation that crystallization was no problem with phthalocyanine green; a slight degree of chlorination was the answer.

The Du Pont Co. and General Dyestuff Corp. pioneered the phthalocyanines in this country, were joined—in short order—by several other pigments manufacturers. During World War II and the immediate post-war period, severe shortages of phthalic anhydride (used chiefly for alkyd resin manufacture), urea, sulfuric acid and copper effectively limited expansion. Nevertheless, the roster of processors of phthalocyanine pigments has grown considerably since 1945. The Korean war cast another pall on the raw materials situation, but the picture today is generally good.

MANY WAYS BETTER

In the phthalocyanines, pigment makers found a combination of permanence, staunch chemical resistance and high tinting strength—qualities they were unaccustomed to in conventional blue and green shades.

Briefly, here's what the phthalocyamines have to offer: Their tinting strength is twice that of iron blue, 20 times greater than that of ultramarine blue, 4 to 7 times greater than that of peacock blue, and 20 times the strength of chromium hydrate green. And the blue is a true blue; shows almost perfect absorption in the red and yellow areas of the spectrum. Moreover, they're light-fast in full strength, opaque or transparent tints, unaffected by mineral acids (except in very high concentrations), alkalis, soaps, most oxidizing and all reducing agents. Finally, they're resistant to high-temperature baking (450 F), nonbleeding in fats, oils, aqueous media, lacquer and petroleum solvents.

This gratifying array of properties has projected the phthalocyanines into a greater variety of uses than claimed for any other organic pigment. The following are the main outlets for phthalocyanine pigments and the key properties required in each case:

- **Paints and lacquers** (probably top consumers)—light-fastness, high tinctorial strength, non-bleeding characteristics
- **Linoleum**—permanence, alkali resistance
- **Rubber goods**—permanence in dilute tints, non-reactivity, high-temperature resistance
- **Textile printing inks**—permanence, wash-fastness, non-crocking, gas-proof, resistance to dry cleaning, fast to bleaches, lack of cross-dyeing effects on blends of synthetic and natural fibers
- **Artist's colors** — permanence, cleanliness of blue, high tinctorial strength
- **Plastics** — high-temperature resistance, permanence in thin transparent films, chemical resistance
- **Printing inks**—soap resistance, amenability to permanent process printing
- **Roofing granules**—permanence, insolubility in water
- **Wallpaper**—permanence, soap resistance

ART VS SCIENCE

Although there are considerable variations in procedure (which, in each case, is a closely guarded secret of the pigment making art*) the usual method of manufacture consists of reacting phthalic anhydride, urea, cuprous chloride and an ancillary agent in a solvent at about 195 to 205 C for 6 to 12 hours. The mixture is filtered, steam blown to remove the solvent and dried in an oven. The resulting horny mass is then dissolved in concentrated sulfuric acid and quenched in water. A blue pigment precipitates from the dilute acid solution, is available for conversion to the dry color or various dispersions after neutralization and washing.

To make the green, chlorination—with chlorine and aluminum chloride-sodium chloride flux—is carried out during the sulfuric acid pasting.

When a water-soluble dyestuff is desired for direct cotton dyeing, the acid pasting is done in oleum instead of sulfuric acid and the dyestuff is recovered as the ammonium salt.

ALTERING TO SUIT

Before going to market, however, a phthalocyanine product is apt to bear little resemblance to the basic pigment produced by the method described in the preceding section. One of the following processes is employed to put the pigment in a form best suited to a consumer's requirements.

Dry Colors: After precipitation from acid solution, the pigment is filtered, washed and treated with a soap or other surface active agent. It's then dried in a hot air oven and micropulverized for shipment. In this dry form it is called a "toner" or pure color. To obtain specialized products, several modifications of the dry color process are common:

- Precipitation on the pigment of an alkaline earth (e.g. barium) salt of rosin to yield a dry color which is softer grinding, easier to disperse in organic media. This kind of color is a "resinated" pigment.
- Precipitation of the pigment in the presence of clay, whiting, blanc fixe or other extender. The product is known as a "lake" color.
- Precipitation of the sulfonated dyestuff with an alkaline earth metal to yield a salt-type pigment of brilliant hue. This kind of pigment, unfortunately, does not exhibit the degree of permanence common to most phthalocyanine pigments.
- Preparation of a metal-free phthalocyanine from an unstable salt which gives up its metal during the acid pasting process. Manufacture of this type of pigment has been limited by process difficulties. And the "peacock" shade of the metal-free pigment is successfully duplicated by other blues of extremely clean hue, which are prepared by simpler, more economical processes.

Flushed Colors: Flushing (i.e., transferring the water-wet, filtered pigment to a liquid organic medium) gives the consumer a pigment already dispersed in a vehicle best suited to his particular need. News ink vehicles, for example, are—for the most part—mineral oil and resin. A news-ink producer buys his pigment flushed in mineral oil, saves himself the time and trouble of the dispersing step, is one jump ahead from the start in his formulating operations.

Besides convenience, flushing offers the consumer his phthalocyanine pigments at their highest tinctorial strength. This is not the case with dry colors. The hot-air drying employed in dry color manufacture reduces tinting strength by causing case-hardening of pigment agglomerates. No known method of grinding the dry color has been able to recover this lost strength which amounts to 8% to 15% depending upon the shade of pigment.

Many producers of flushed phthalocyanines do not manufacture the primary pigment, but buy phthalocyanine presscake for their purposes. This type of specialization permits these companies to draw on the variety of pigments on the market, does not limit them to captive colors. In general, producers of flushed phthalocyanines can offer their products for little or no more than the combined raw mate-

* Theory of pigment-making is not as formal as some would like it to be. Experience and that familiar intangible, "know-how," are still the pigment chemist's greatest assets.

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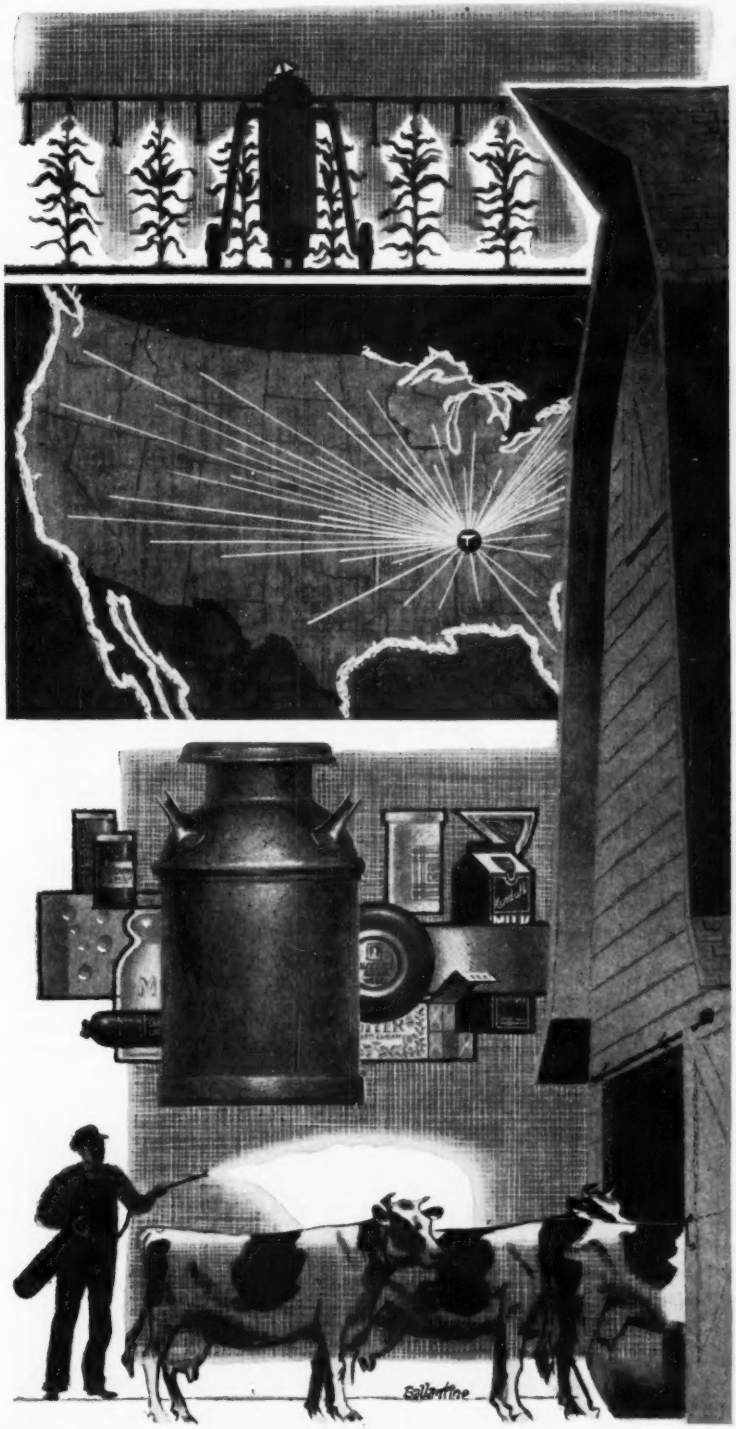

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rial cost of the pigment and vehicle; their profit comes from the tinting strength gained in the flushing process.

The actual flushing procedure goes like this: Pigment presscake is charged into a large double-arm dough mixer, mixed with oleoresinous vehicles. These vehicles preferentially wet the organophilic pigment, squeeze out water during the phase transfer. Most of the water is mechanically dumped; the small amount remaining in the pigment mass is removed under vacuum. The ink (pigment and vehicle) is then adjusted with oils or solvents to the correct pigment content and run into drums for shipment.

The first flushings of phthalocyanine pigments, chiefly for the paint trade, were prepared with linseed oils. But the expanding range of application of the phthalocyannines has altered this picture considerably. Today they are available in a wide assortment of vehicles for a multitude of end-products:

- **Gloss varnishes** for printing inks
- **Mineral oils** for printing inks, carbon paper and other wax-containing products
- **Terpenes** for textile printing inks
- **Castor oil** for lacquers, artificial leathers, and plastics
- **Plasticizers** for vinyl and polyester resins
- **Heat-set varnishes** for high-speed magazine printing inks
- **Rotogravure vehicles** for magazine and food carton printing inks
- **Hydrocarbons** for heat set printing inks

Resin Chips and Pastes: Another pigment dispersion process was sparked by the problem of converting the gritty, dry phthalocyanines to very fine particles required for industrial lacquers and finishes. It's a method for the production of resin chips and pastes.

The dry color is mixed with alcohol-wet nitrocellulose or another resin and milled under controlled temperature conditions on a two-roll rubber mill until the proper degree of fineness is reached. The resulting pigmented resin sheet is then stripped off the mill and chipped. Pastes are made by adding to the chips, a specified amount of resin-dissolving compound. Chips and pastes are available in nitrocellulose, vinyl copolymers, phenolic, natural and a variety of rubber resins.

Water Dispersible Pastes, Powders: Formulators of aqueous products may purchase their phthalocyanines as pastes dispersed in water. Here, too, they save the expense of dispersing the dry color, avoid the tinting strength loss that accompanies dry color manufacture. When the 70% to 80% of water contained in the paste is not tolerable in his system, the formulator may still avoid grinding by taking a water dispersible powder. But a premium is charged for the pigment in this form.

Conversion of the blue and green pigments to water dispersible forms involves treatment with surface active agents to yield free-flowing water pastes containing 20% to 30% of pigment solids, or powders containing 10% to 35% of active color pigment. The process usually starts with the water-washed presscake, captive or purchased, is carried out in beaters or high-speed mixers. When the charge is homogeneous, soaps or wetting agents are added to produce a stable dispersion of pigment in water.

OVERTAKING THE FIELD

Production figures tell the story of the rapid strides taken by the phthalocyanines in their young lifetime. In 1941 the U.S. Tariff Commission reported 10,000 pounds of pure phthalocyanine blue manufactured in this country. By 1951 the figure for pure toners had skyrocketed to 1,794,000 pounds, almost a 17,000% increase.

The phthalocyanines carved their greatest market gains out of virgin territory. They literally created their own markets with the ability to color materials that were difficult, almost impossible to color in previous commercial practice. Current rising consumption of phthalocyanines in colored plastics, textile lakes for pigment printing, latex paints, permanent process magazine printing inks and linoleum (especially synthetic floor-coverings like the vinyls) is the direct result of this pioneering effort.

In ten years phthalocyanines have come from insignificant (tonnage-wise) newcomers to the third most important type of organic pigment, surpassed only by lithol reds and toluidine reds. From the dollar-value standpoint, the phthalocyanines in 1951 were second only to lithols: 1,324,000 pounds of phthalocyanine blue, alone, were sold for more than $4.4 million; the lithols market was pegged at about $5.2 million.

This striking record takes on added significance in the light of some restraining factors. First and foremost is the comparatively high cost of the phthalocyanines. Ranging from $3.85 to $4.40 a pound for the full-strength pigments, they are generally ruled out for such uses as crayons, comic inks, cement colors, etc. But improved methods of production coming into

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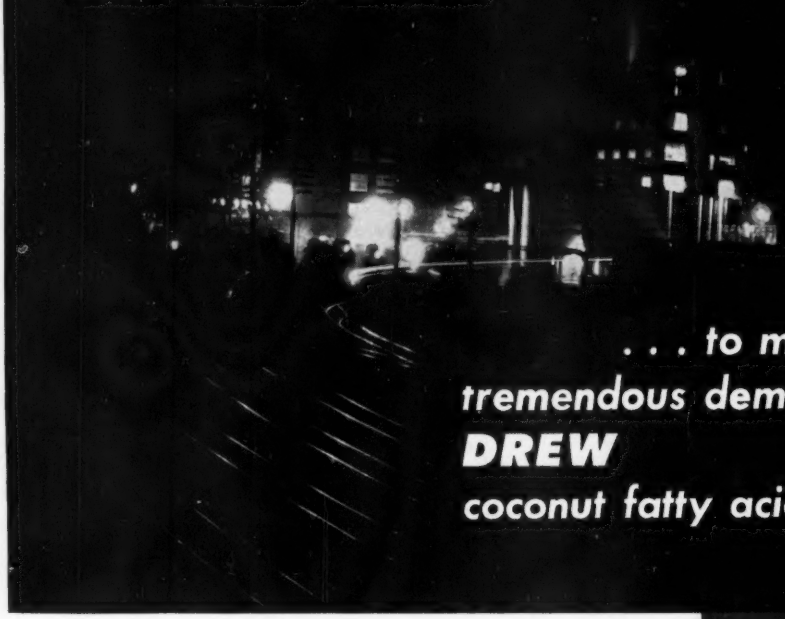

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use may well bring several lower cost outlets within reach.

Raw materials have proved to be another hurdle in the path of phthalocyanine development. Shortages (as previously mentioned) have kept them in short supply, on and off, during the past decade. Processors and formulators have learned by bitter experience that the phthalocyanines are among the first to go on the critical list when basic commodities like sulfuric acid and phthalic anhydride become tight.

Foreign competition is not an important factor in the phthalocyanine market. Uniformity of quality and the financial responsibility of the supplier are so important in the pigment industry that few consumers would be willing to take a chance on imported material. Organic chemicals producers have also learned that pigment manufacture is a very exacting field. Almost any one can make copper phthalocyanine; but getting a top-grade phthalocyanine pigment is another story. Rigid specifications as to color, hue, tinting strength, texture, opacity and oil absorption have discouraged many hopeful, but poorly instructed, neophyte producers.

Predicting the future, always a tricky business, is further complicated in the case of the phthalocyanines by the almost complete absence of data on the market break-down. In all fairness, then, only a qualitative estimate is in order. And, on the strength of current research and production activity, it's a bright one: Mounting demand in large-volume outlets like washable paints, synthetic textile printing inks, plastic upholstery, colorful roof tops, and permanent automotive finishes foreshadows a steadily accelerating phthalocyanine production curve in years to come.

WHAT'S AVAILABLE

On the following pages is a tabulated directory of the principal phthalocyanine products available today. This comprehensive list, the first of its kind published in this country, was made possible by the cooperation of the companies whose products appear. Product information, in each case, is the manufacturer's.

No comparisons—as to shade, texture, oil absorption, tinctorial strength, covering power, or working properties—are made for competitive pigment types. Dissimilar test methods and end-use differences make such applications of questionable value. In the last analysis, a formulator must determine his particular requirements, carry out his tests with an eye to the use he intends to make of a given color.

A manufacturer listing several pigment-lakes in his dry color line will probably make others (not listed) to suit a customer's special need. Although they may list only a few products in their line, manufacturers of flushed colors will generally flush their pigments in any stable vehicle that lends itself to the flushing process. And most of the dry colors listed will also be supplied as presscake upon request.

PRODUCERS

Ansbacher-Siegle Corp.
Rosebank, Staten Island, N.Y.

Calco Chemical Division
American Cyanamid Co.
Bound Brook, New Jersey

E. I. duPont de Nemours & Co.
Pigments Dept., Wilmington 98, Del.

J. S. & W. R. Eakins, Inc.
55 Berry St., Brooklyn, N.Y.

Federal Color Laboratories, Inc.
4633 Forest Ave., Cincinnati, Ohio

Filo Color & Chemical Corp.
202 East 44 St., New York 17, N.Y.

Fine Colors Co.
21-29 McBride Ave., Paterson, N.J.

General Dyestuff Corp.
435 Hudson St., New York 14, N.Y.

Harmon Color Works
P.O. Box 14, Hawthorne, N.J.

Hilton-Davis Chemical Co.
2235 Langdon Farm Rd., Cinn., Ohio

Holland Color & Chemical Co.
Holland, Mich.

Kentucky Color & Chemical Co., Inc.
Louisville, Ky.

H. Kohnstamm & Co., Inc.
87 Park Place, New York 7, N.Y.

Mineral Pigments Corp.
Muirkirk, Md.

Pennsylvania Color & Chemical Co.
Fine Run Rd., Doylestown, Pa.

RBH Dispersions Division
Interchemical Corp.
Bound Brook, N.J.

Reichhold Chemicals, Inc.
105 Bedford Ave., Brooklyn, N.Y.

Sherwin-Williams Co.
115 St. & Cottage Grove Ave., Chicago

Standard Ultramarine Co.
Huntington, W.Va.

Sun Chemical Corp.
Pigments Div., 309 Sussex St.,
Harrison, N.J.

Thomasset Colors, Inc.
338 Wilson Ave., Newark 5, N.J.

Western Dry Color Co.
600 W. 52 St., Chicago 9, Ill.

Wilson Organic Chemicals, Inc.
P.O. Box 452, Sayreville, N.J.

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DRY COLORS

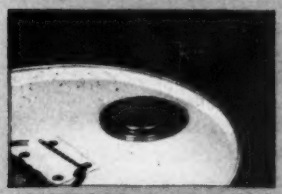
SUPPLIER	PRODUCT NAME	CODE NO.	TYPE OF PIGMENT	EXTENDERS
Ansbacher-Siegle	Fastolux Blue Toner	48T01	Phthalo. blue	
	Fastolux Blue Toner	48T04	Phthalo. blue	
	Fastolux Blue	48T13	Phthalo. blue	
	Fastolux Blue	48T15	Phthalo. blue	
	Fastolux Blue	48T16	Phthalo. blue	
	Fastolux Peacock Blue	48T17*	Phthalo. blue	
	Fastolux Blue	48-3207*	Non-cryst., non-floc.	
	Fastolux Blue	48-3208*	Non-cryst., non-floc.	
	Fastolux Blue	48-3559*	Non-cryst., non-floc.	
	Fastolux Peacock Blue	48-3775*	Non-cryst., non-floc.	
	Fastolux Blue	48E11	Phthalo. blue	Calcium carbonate
	Fastolux Green	64W9934	Phthalo. green	
Calco	Cyan Blue Toner	55-9101	Non-crystalizing	
	Cyan Blue B	55-9081	Resinated	Barium resinate
	Cyan Blue Toner GT	55-3300	Peacock shade	
	Cyan Green Toner G	15-9012	Phthalo. green	
	Cyan Green G	15-9021	Resinated	Barium resinate
Du Pont	Monastral Blue B	BT-284-D	Phthalo. blue	
	Ramapo Blue	Bp-173-D	Resinated	Barium resinate
	Monastral Blue BG	BT-297-D	Peacock shade	
	Monastral Blue Lake	BL-282-D	Phthalo. blue	Aluminum benzoate
	Monastral Blue Lake	BL-220-D	Phthalo. blue	China clay
	Monastral Green	GT-674-D	Phthalo. green	
	Ramapo Green	GP-501-D	Resinated	Barium resinate
	Monastral Green Lake	GM-534-D	Phthalo. green	China clay
Eakins	Dragon Blue Lake		Phthalo. blue	Gloss white
	Dragon Turquoise Blue		Peacock shade	Barytes and clay
Federal	Duratint Blue	4667	Phthalo. blue	
	Duratint Green	4869	Phthalo. green	
Filo	Phthalocyanine Blue	12148	Crystallizing	
	Phthalocyanine Blue	12149	Crystal., resinated	Barium resinate
	Phthalocyanine Blue	12150	Non-crystallizing	
	Phthalocyanine Blue	12151	Non-crystal., resinated	Barium resinate
	Phthalocyanine Blue Special	12152	Non-cryst., low oil-absorption, Soft-grinding	
	Phthalocyanine Blue Reduced	12158	Phthalo. blue	75% Whiting
Fine Colors	Fast Blue 30		Phthalo. blue	
	Fast Chelsea Blue		Non-crystallizing	
	Fast Falmouth Blue		Resinated	Barium resinate
	Fast Peacock Blue Lake 99		Phthalo. blue	Aluminum hydrate
	Fast Green Toner 21		Phthalo. green	
	Fast Burma Green		Resinated	Barium resinate
General Dyestuff	Heliogen Blue BA Powder	27244	Crystallizing	
	Heliogen Blue BKA Powder CF	27266	Crystallizing	
	Heliogen Blue BKA Powder Non-Dusting CF	77289	Crystallizing	
	Resoform Brilliant Blue BP	—	Crystallizing	
	Heliogen Blue BNC Powder New	77288	Non-crystallizing	
	Heliogen Blue BSM Powder	—	Special heat-stable type	
	Heliogen Blue BMP	—	Resinated	Barium resinate
	Heliogen Green GA Powder	77438	Phthalo. green	
	Resoform Brilliant Green Powder GP	—	Phthalo. green	
	Heliogen Green GMP	SD 77452	Resinated	Barium resinate
Hilton-Davis	Permanent Pigment Blue	30-0215	Crystallizing, red shade	
Harmon	Phthalo. Skyline Blue Toner	B4714	Phthalo. blue	
	Zona Blue	B4700	Phthalo. blue	
	Resanine Blue	B4703	Resinated	Metallic resinate
	Palomar Blue	B-4773	Non-flocculating	Aluminum benzoate
	Phthalo. Skyline Blue Toner	B-4767	Phthalo. blue	
	Resinated Phthalo. Blue	B-4769	Resinated	Metallic resinate
	Phthalo. Blue Powder	B-4731	Phthalo. blue	
	Phthalo. Blue Greenish	B-4790	Peacock shade	

* Recently introduced. NOTE: "Phthalo. blue" (or green) appears under TYPE OF PIGMENT in lieu of more specific information.

FLEXSPOUT®

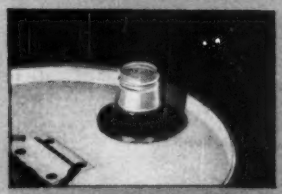
Helps Sell *More* of any Product Sold in Steel Pails

BECAUSE CUSTOMERS PREFER THESE FLEXSPOUT FEATURES



LEAKPROOF—One-piece molded plastic, sealed directly on pail metal. Stronger than pail itself.

EASY TO OPEN—Without special tools. Coin, screwdriver or any sharp object does the job.



FLEXIBLE POURING SPOUT—Extends for easy pouring. No mess or fuss . . . because only inside of spout touches liquid.

RE-SEALS TIGHTLY—With plastic screw cap. Protects volatile liquids. Spout retracts for easy stacking.

RIEKE METAL PRODUCTS CORPORATION
AUBURN, INDIANA

FLEXSPOUT simplifies using, pouring and storing your liquid products. It's a powerful sales tool for any liquid that's packaged in steel pails.

FLEXSPOUT is odorless, tasteless and non-toxic. It resists attack by almost all chemicals, solvents and oils. Easily applied with one stroke of a simple hand tool, it permits faster filling and sealing, lowers production costs. For a few cents a pail it adds dollars worth of sales appeal to your products.

Almost all pail manufacturers are equipped to furnish pails ready for use with the **FLEXSPOUT** closure. For more details, prices and a free sample, just fill out and mail the handy coupon.

---MAIL THIS COUPON TODAY---

RIEKE METAL PRODUCTS CORPORATION
AUBURN, INDIANA

We'd like to know more about the new FLEXSPOUT Closure.
Please send us... ☐ Free Sample ☐ Brochure

COMPANY_____
NAME _____ TITLE _____
STREET_____
CITY_____ STATE _____

DRY COLORS (Continued)

SUPPLIER	PRODUCT NAME	CODE NO.	TYPE OF PIGMENT	EXTENDERS
	Amethyst Blue Toner	B-47	Phthalo. blue	
	Phthalo. Blue Toner	B-49	Phthalo. blue	
	Opaline Green	G-1	Phthalo. green	
	Opaline Green	G-60	Phthalo. green	
	Phthalocyanine Green	G-5050	Phthalo. green	
	Non-Flocculating Green	G-25	Phthalo. green	Aluminum benzoate
	Non-Flocculating Green	G-129	Phthalo. green	Aluminum benzoate
	Resinated Phthalo. Green	G-5025	Resinated	Metallic resinate
Holland	Permanent Blue Lake	BT-404	Resinated	Barium resinate
	Permanent Blue Toner	BT-406	Phthalo. blue	
	Permanent Blue Toner G	BT-407	Peacock shade	
	Permanent Blue Toner	BT-398	Phthalo. blue	
	Permanent Blue RS	BT-381	Resinated	Barium resinate
	Permanent Green Toner	GT-376	Phthalo. green	
	Permanent Green Lake	GT-391	Resinated	Barium resinate
Imperial	Franconia Blue	A-4431	Phthalo. blue	
	Laconia Blue	A-4432	Peacock shade	
	Sherwood Green	A-4436	Phthalo. green	
Kentucky	Zulu Blue	4849	Non-crystallizing	
	Zulu Blue	4851	Non-crystallizing	
	Zulu Blue	573J	Non-crystallizing with surface treatment	
	Zulu Blue	4845	Non-crystal., resinated	Barium resinate
	Zulu Blue Lake	4844	Phthalo. blue lake	
	Zulu Green	3820	Phthalo. green	
	Zulu Green	804J	Phthalo. green with surface treatment	
Kohnstamm	Monofast Blue	A5712	Phthalo. blue	
	Monofast Blue	A5714	Resinated	Barium resinate
	Monofast Blue	A4931	Phthalo. blue lake	Blanc fixe
	Monofast Green	A8768	Resinated	Barium resinate
	Monofast Green	A9804	Phthalo. green lake	Blanc fixe
Mineral Pigments	Pure Green Toner	R-1334	Phthalo. green	
	Phthalocyanine Lake	M-2066	Phthalo. blue	Calcium carbonate
	Phthalo. Blue Toner	M-2100	Phthalo. blue	
	Res. Phthalo. Blue Toner	M-2101	Phthalo. blue	Barium resinate
	Phthalo. Blue Lake	M-1988	Phthalo. blue	Calcium carbonate
Reichhold	Phthalocine Blue Toner	3530	Phthalo. blue	
	Phthalocine Green Toner	4515	Phthalo. green	
Sherwin-Williams	Solfast Sky Blue R	CP961	Phthalo. blue	
	Solfast Sky Blue	CP621	Resinated	
	Solfast Sky Blue	CP988	Resinated	Barium resinate
	Solfast Sky Blue NC	CP1037	Non-crystallizing	Barium resinate
	Solfast Sky Blue M	CP1066	Peacock shade	
	Solfast Sky Blue Lake	CP1020	Phthalo. blue	Whiting
	Solfast Green	CP771	Phthalo. green	
	Solfast Green	CP983	Phthalo. green	
Standard Ultramarine	SUCO Phthalo. Blue B	P-4500	Crystallizing	
	SUCO Phthalo. Blue B	P-4530	Crystal., resinated	Barium resinate
	SUCO Phthalo. Blue BNC	P-4550	Non-crystallizing	
	SUCO Phthalo. Blue	P-4577	Toner	Whiting (75%)
	SUCO Phthalo. Green	P-4755	Toner	
Sun Chemical	Phthalocyanine Blue	52-A	Crystallizing toner	
	Phthalocyanine Blue	52-B	Non-crystal. toner	
	Phthalocyanine Blue	52-C	Non-crysal. toner, very finely puverized	
	Phthalo. Blue Resinated	52-D	Resinated non-crystal	Barium resinate
	Phthalo. Blue Resinated	52-E	Resinated, crystal.	Barium resinate
	Phthalocyanine Blue	52-F	Peacock shade	
	Phthalo. Green Toner	74-H	Regular full-strength green	
	Phthalo. Green Resinated	74-F	Resinated green	Barium resinate
Thomasset	Synthaline Blue	1592	Phthalo. blue	
	Synthaline Blue	1950*	Phthalo. blue	
	Synthaline Blue	1591	Resinated	Barium resinate
	Aqualine Blue	1578	Resinated	Barium resinate
	Aqualine Blue	1939	Phthalo. blue lake	Whiting
Western	C. P. Phthalo. Blue	256	Phthalo. blue	
	C. P. Phthalo. Blue	259*	Phthalo. blue	

* Recently introduced. NOTE: "Phthalo. blue" (or green) appears under TYPE OF PIGMENT in lieu of more specific information.

Castorwax®

HYDROGENATED CASTOR OIL

Put this useful wax to the test. It differs from tristearin in this respect: 85% of its fatty acid groups have the hydroxyl group characteristic of castor oil. Check it for its numerous production advantages.

CHOOSE FROM 2 FORMS

FLAKE—Very useful in hot melts, as a lubricant in drawing or rolling metals, in the manufacture of metallic soaps for greases, in paper coatings, as a water proofing agent, et cetera.

POWDER—Useful in applications where the comminuted form permits dusting or dry impregnation. Outstanding example: Mixed with fine materials to be molded or tableted, in which case it has been found definitely superior to stearic acid or tristearin.

CHECK THESE 5 POINTS:

1. High melting point, 85-87°C.
2. Excellent color, white in the solid form and straw-colored in the molten form.
3. Extreme insolubility, in that none of the common organic solvents will dissolve Castorwax.
4. High resistance to oils, greases.
5. Good hardness with fair gloss.

MAIL COUPON FOR SAMPLES AND DATA ▶

THE Baker CASTOR OIL COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

LOS ANGELES • CHICAGO

BAKER CASTOR OIL CO.
120 Broadway, New York 5, N. Y.

Please send us:

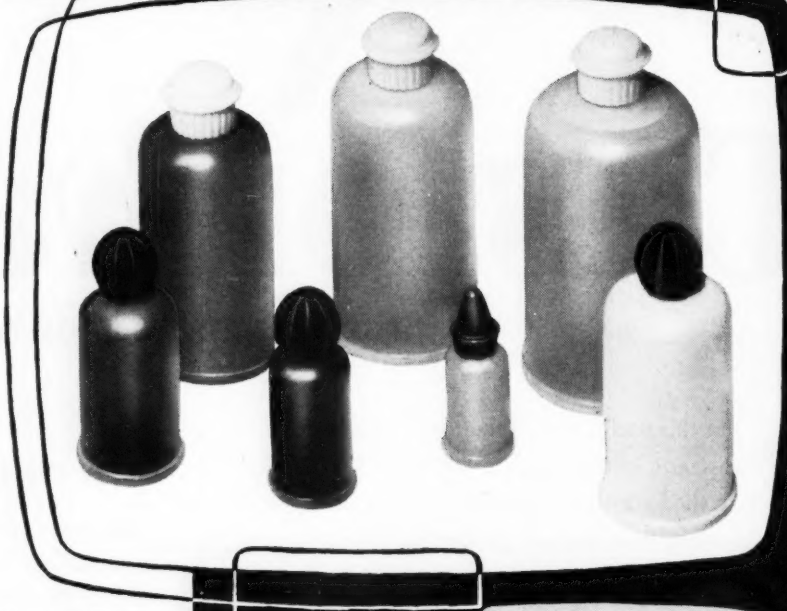
1. Technical Bulletin #7 ☐
2. Property Sheets ☐
3. Sample: Powder ☐ Flake ☐

Name.....

Company.....Title.....

Address.....

Look for This Mark . . . . . It's the *Secret of Success*



Horizontal and Vertical sprays or droppers for lotion or powder

● The beauty and engineered quality of the IMCO Plastic Bottle has eye appeal and touch appeal, but most important, sales appeal. These are the factors that have helped form IMCO's pattern of success for many progressive manufacturers whom we serve.

Because we manufacture in our own plant all the parts for our plastic bottles and print your design on them, they come to you complete and ready to fill with either powder or liquid. Bottles come in a variety of attractive colors and are available in ½, 1, 2, 4, 6, 8, and 12 ounce sizes with colored caps, with leak-proof atomizer or spout and closures.

Send for a sample and study the fine engineered quality of IMCO squeeze-type plastc bottles. Visualize the sales possibilities for your product and join Injection Molding Company's pattern of success.

WHEN YOU SEE THIS MARK—

You're Looking at Quality

IMCO CONTAINER CORP.

Sales Agent for

INJECTION MOLDING CO.
FLEXCEL CONTAINER CO.
EXCELSIOR PLASTICS CO.

75th and Cleveland Streets, Kansas City 30, Mo.
NEW YORK OFFICE: 10 East 39th St., New York 16, N. Y.
Telephone: ORegon 9-2677

DRY COLORS (Continued)

SUPPLIER	PRODUCT NAME	CODE NO.	TYPE OF PIGMENT	EXTENDERS
	Phthalo. Blue	148-B	Resinated	Barium resinate
	Blue	144	Phthalo. blue lake	Branc fixe
	C. P. Phthalo Green	278	Phthalo. green	
	Phthalo. Green	149	Resinated	Barium resinate
	Green	301	Phthalo. green lake	Branc fixe
	C. P. Brilliant Green Lt.	410*	Mixture of phthalo. blue and chrome yellow	

FLUSHED COLORS

SUPPLIER	CODE NO.	PIGMENT AND %	VEHICLE AND %
Ansbacher-Siegle	P48-103	25% Phthalo. blue	75% Castor oil
	P48-108	36% Phthalo. blue	64% Linseed oil
	P48-110	36% Phthalo. blue	64% Litho varnish #3
	P48-114	30% Phthalo. blue	70% Dioctyl phthalate
	P48-116	36% Phthalo. blue	64% Litho varnish
	P48-117	36% Phthalo. blue	64% Litho varnish
	P48-123*	36% Phthalo. blue	64% Litho varnish
	P48-124*	36% Phthalo. blue	64% Litho varnish
	P48-125*	20% Phthalo. blue	80% Linseed oil
	P64-102	35% Phthalo. green	65% Dioctyl phthalate
Federal	DB-236	Phthalo. blue	No. 3 Linseed oil
	PPB-189	Peacock shade phthalo. blue	No. 3 Linseed oil
	DG-120	Phthalo. green	No. 3 Linseed oil
Filo	12153	35% Crystallizing phthalo. blue	65% #3 Litho varnish
	12154	30% Crystallizing phthalo. blue	70% #3 Litho varnish
	12155	31.5% Crystallizing phthalo. blue	68.5% #5 Litho varnish
	12156	20% Non-crystallizing phthalo. blue	40% Alkyd resin—40% Solvesso #100
	12157	30% Non-crystallizing phthalo. blue	70% Dioctyl phthalate
Fine Colors		32% Phthalo. blue	68% Litho varnish
Hilton-Davis	65-F-300	27% Crystallizing phthalo. blue, red shade	73% Steam-set vehicle
	65-F-300	27% Crystallizing phthalo. blue, red shade	73% Gravure vehicle
	65-F-300	27% Crystallizing phthalo. blue, red shade	73% Linseed varnish
	65-F-300	20% Crystallizing phthalo. blue, red shade	80% Aniline ink vehicle
Holland	FS-539	20% Phthalo. blue Lake (BT-404)	40% Duraplex C-49 20% VM & P naphtha
	FS-604	14% Phthalo. blue toner (BT-398)	38% Glyptal #2477 40% Methyl isobutyl ketone and plasticizer
	FS-637	19% Phthalo. green toner (GT-376)	38% Glyptal #2477 27.8% Toluol and plasticizer
	FS-133	22% Phthalo. green toner (GT-376)	45% Syntex #23 33% Xylol
	FS-772	17% Phthalo. blue (BT-398)	55% Universal shading vehicle X-1335 28% Lactol spirits
	FS-784	22.5% Phthalo. green (GT-376)	62% Universal shading vehicle X-1335 15.5% Lactol spirits
	FS-715	40% Phthalo. green (GT-376)	60% Dioctyl phthalate
	FS-716	33% Phthalo. blue (BT-398)	67% Dioctyl phthalate
	FS-481	27% Phthalo. blue lake (BT-404)	73% #1 Regular varnish
	FS-476	32.5% Phthalo. green toner (GT-376)	67.5% #1 Regular varnish
	FS-674	31% Phthalo. blue toner (BT-406)	69% #3 Pale litho varnish
	FS-773	46% Phthalo. blue toner G (BT-407)	54% #3 Pale litho varnish
Sherwin-Williams	FL-327	17% Non-crystallizing blue (CP 1037)	83% Gen. purpose alkyd varnish XAR C11
	FL-316	20% Regular blue (CP 961)	80% Gen. purpose alkyd varnish XAR C11
	FL-218	20% Non-crystallizing blue (CP 1037)	80% High quality alkyd varnish XAD 26
	FL-346	20% Regular green (CP 771)	80% High quality alkyd varnish XAD 26
	CP-776	20% Regular blue (CP 961)	80% Linseed oil
	CP 1047	20% Non-crystallizing blue (CP 1037)	80% Linseed oil
	CP 956	22% Regular green (CP 771)	78% Linseed oil
	FL-291	35% Regular green (CP 771)	65% Castor oil
	CP 969	35% Regular blue (CP 961)	65% Litho varnish
	CP 660	33% Regular blue (CP 538)	67% Litho varnish
	CP 1054	36% Peacock shade blue (CP 1066)	64% Litho varnish
	CP 1076	37% Green shade blue	63% Litho varnish
	CP 772	35% Regular green (CP 771)	65% Litho varnish
	CP 1050	36% Regular green (CP 771)	64% Litho varnish
	CP 1210	37% Regular green (CP 771)	63% Litho varnish

* Recently introduced. NOTE: "Phthalo. blue" (or green) appears under TYPE OF PIGMENT in lieu of more specific information.

FLUSHED COLORS (Continued)

SUPPLIER	CODE NO.	PIGMENT AND %	VEHICLE AND %
	CPX 495	35% Green shade blue	65% Mineral oil
	CP 1038	33% Regular blue (CP 558)	67% Alkyd printing ink varnish XLV 10
	CP 1201	37% Green shade blue	63% Alkyd printing ink varnish XLV 10
	CP 1053	35% Regular blue (CP 961)	65% Alkyd printing ink varnish XLV C14
	CP 1057	36% Peacock shade blue (CP 1066)	64% Alkyd printing ink varnish XLV C14
	CP 1073	27% Regular blue (CP 961)	73% Moisture-set vehicle XLV 74
	CP 1093	33% Green shade blue	67% Heat-set vehicle XLV C21
	CP 1092	26% Regular blue (CP 558)	74% Heat-set vehicle XLV C21
	CP 993	35% Regular blue (CP 961)	65% Heat-set vehicle XLV C21
	CP 995	35% Regular green (CP 771)	65% Heat-set vehicle XLV C21
	CP 1207	35% Regular blue (CP 961)	65% Quick dry off-set vehicle XLV C17
	CPX 504	32% Non-crystallizing blue (CP 1037)	68% Dioctyl phthalate
	CPX 507	35% Regular blue (CP 961)	65% Dioctyl phthalate
	CPX 508	35% Regular green (CP 771)	65% Dioctyl phthalate
Standard-Ultramarine	4-AP-500	25% Crystallizing phthalo. blue	75% Alkyd resin
	4-LP-501	36% Crystallizing phthalo. blue	64% Linseed varnish
	4-LP-502	30% Crystallizing phthalo. blue	70% Linseed varnish
	4-LP-503	36% Crystallizing phthalo. blue	64% Linseed varnish
Sun Chemical	5201-A*	28% Peacock phthalo. blue	72% News ink vehicle
	5205-A	32% Crystallizing phthalo. blue	68% Pale litho varnish (63 poise)
	5202-D	40% Peacock phthalo. blue	60% Regular litho varnish (63 poise)
	5203-B*	35% Crystallizing phthalo. blue	65% Heat-set vehicle (280-290 solvent)
	5207-A	30% Crystallizing phthalo. blue	70% Gloss vehicle
	5208-A	28.5% Crystallizing phthalo. blue	71.5% Long oil alkyd varnish
	5208-B*	38% Peacock phthalo. blue	62% Long oil alkyd varnish
	PXB-1001	30% Crystallizing phthalo. blue	70% Dioctyl phthalate
	PXB-1002	25% Non-crystallizing phthalo. blue	60% Dioctyl phthalate 15% Paraplex G-60
	PXB-1003*	21.25% Non-crystallizing phthalo. blue	63% Dioctyl phthalate 15.75% Paraplex G-60
	PXB-1012*	39% Crystallizing phthalo. blue	61% No. 4 Pale blown castor oil
	7207-A	33.5% Phthalo. green toner	66.5% Gloss vehicle
	7208-A	38.5% Phthalo. green toner	61.5% Long oil alkyd varnish
	PXG-1001	40% Phthalo. green toner	70% Dioctyl phthalate
	PXG-1002	35% Phthalo. green toner	52% Dioctyl phthalate 13% Paraplex G-60
	PXG-1003*	29.75% Phthalo. green toner	55% Dioctyl phthalate 14.25% Paraplex G-60
Thomasset	1955*	32% Phthalo. blue	68% Litho varnish
	1949*	20% Phthalo. blue	40% Alkyd 40% Solvent
	1593	35% Phthalo. blue	65% Litho varnish

WATER DISPERSIBLE POWDERS

SUPPLIER	PRODUCT NAME	CODE NO.	PIGMENT
Ansbacher-Siegle	Fastolux Blue	48 WD 18	Phthalo. blue
	Fastolux Green	64 WD 18	Phthalo. green
Dupont	Monastral Blue BWD	BP-192-D	Phthalo. blue
	Monastral Green WD	GP-511-D	Phthalo. green
General-Dyestuff	Heliogen Blue BWS Extra	27263	Crystallizing phthalo. blue
	Heliogen Blue BWSN Powder Special	77285	Crystallizing phthalo. blue
	Heliogen Green GWS Powder	27430	Phthalo. green
	Heliogen Green GWS Powder Special		Phthalo. green
Harmon	Water Dispersible Phthalo. Blue	WDB-4765	30% Phthalo. blue
	Water Dispersible Phthalo. Green	WDG-47	30% Phthalo. green
Mineral Pigments	Phthalo. Green Toner-Water Dispersible	5020	Phthalo. green
	Phthalo. Blue Toner-Water Dispersible	M-2340	Phthalo. blue
Sherwin-Williams	Solfast Sky Blue WD	CP 1029	Phthalo. blue
	Solfast Sky Blue WD	CP 767	Non-crystallizing phthalo. blue
	Solfast Green WD	CP 707	Regular phthalo. green
Standard-Ultramarine	Suco Phthalo. Blue Lake WD	P-4540	10% Crystallizing phthalo. blue
	Suco Phthalo. Green Lake WD	P-4790	10% Phthalo. green
Sun Chemical	Phthalo. Blue WD	52A 15-A	33.33% Phthalo. blue
	Phthalo. Green WD	74H 15-A	33.33% Phthalo. green
Thomasset	Aquamarine Blue BWS	1671	40% Phthalo. blue
Western	Phthalo. Blue	631	Phthalo. blue
	Phthalo. Green	632	Phthalo. green

* Recently introduced. NOTE: "Phthalo. blue" (or green) appears under TYPE OF PIGMENT in lieu of more specific information.

CHEMICAL MANUFACTURERS!

NOW YOU CAN PACK IN A&S MULTIWALL PLASTO-PAK BAGS

PLASTO-PAK Paper bags are economical

PLASTO-PAK Paper bags are easy-to-pack

Delivered empty multiwalls save up to 10 times the shipping space of other packages.

CHECK THE FOLLOWING

A&S FEATURES

- **STA STACK**—Creped outer wall takes skid and slip out of stacking. Makes handling and storage easier.
- **SHUR-CLOSE**—Ingenious valve assures less dust when packing—less sifting when packed—prevents waste.
- **EXPENDABLE PALLETS**—Palletized shipments of A&S bags lower your handling costs, minimize storage space.
- **1 to 4 Color Printing**—Strong, deep colors for finest appearance.

If you use expensive containers:

Try this Field-Tested multiwall bag made of several plies of specification kraft, with the inside ply coated with polyethylene.

Ends of the Plasto-Pak are sealed with the A&S method of closing the needle holes at bottom of sewn open mouth bags and at both ends of sewn valve bags, to keep moisture out.

Add heat sealable polyethylene coated tuck-in sleeves and your product is completely protected against moisture, contamination and closed to prevent loss of material by sifting.

ARKELL & SMITHS · THE OLDEST NAME IN PAPER BAGS · A&S

ARKELL and SMITHS

CANAJOHARIE, N. Y. • WELLSBURG, W. VA. • MOBILE, ALA.

WATER DISPERSIBLE PASTES

SUPPLIER	PRODUCT NAME	CODE NO.	PIGMENT
Ansbacher-Siegle	Fastolux Green Paste	W64-113	20% Phthalo. green
	Fastolux Blue Paste	W48-126	20% Phthalo. blue
Dupont	Monastral Blue B Paste	BT-287-P	20% Phthalo. blue
	Monastral Green Paste	GT-675-P	20% Phthalo. green
Eakins	Latex Blue	5651*	Phthalo. blue extended with clay
	Fast Turquoise Blue		Phthalo. blue extended with gloss white and barytes
	Fast Emerald Green		Phthalo. green extended with gloss white and barytes
General-Dyestuff	Heliogen Blue BA-CF Paste	27251	Crystallizing phthalo. blue
	Heliogen Green BTA Paste	2725	Phthalo. green toner
Mineral Pigments	Phthalo. Green Pulp	R-1447	20% Phthalo. green
	Phthalo. Blue Pulp	M-2099	20% Phthalo. blue
Sherwin-Williams	Phthalo. Blue Water Pulp	CPX 398	20% Phthalo. blue (CP 558)
	Phthalo. Blue Water Pulp	CPX 497	20% Phthalo. blue NC (CP 1037)
	Phthalo. Blue Water Pulp	CP 1080	20% Phthalo. blue NC (1037)
	Phthalo. Blue Water Pulp	CP 1041	20% Phthalo. blue (CP 961)
Standard-Ultramarine	Suco Phthalo. Blue BWD Pulp	PX-45	23% Crystallizing phthalo. blue
Sun Chemical	Phthalo. Blue WD	52A20-B	20% Crystallizing blue
	Phthalo. Green WD	72A20-B	20% Phthalo. green

RESIN CHIPS AND PASTES

SUPPLIER	CODE NO.	PIGMENT	RESIN	SOLVENTS
Pennsylvania	5-560	20% Phthalo. Blue	15% Nitrocellulose	65% Mixed
	7-531	18% Phthalo. Blue	28% Ester Gum	54% Mixed
	10-541	25% Phthalo. Blue	12.5% VYHH	62.5% Mixed
	8-563	12% Phthalo. Blue	25% Parlon	63% Toluol
	5-G171	20% Phthalo. Green	15% Nitro-Cellulose	65% Mixed
RBH	C-5086	25% Phthalo. Blue	75% VYHH	
	5408	17.5% Phthalo. Blue	17.5% VYHH	65% Methyl ethyl ketone
	1035	20% Phthalo. Blue	13.4% Nitrocellulose (Visc. 30-35 CPS), 6.6% plasticizer	30% Ethyl alcohol 30% Ethyl acetate
	2319	12.5% Phthalo. Blue	27.5% Alkyd	5.1% Petroleum naphtha 54.9% Aromatic thinner
	5514	15% Phthalo. Blue	30% Chlorinated Rubber	55% Toluol
	9046	20% Phthalo. Blue	12.0% Ethyl Cellulose (Visc. 20 CPS), plasticized with 1.3% dibutyl phthalate	53.4% Toluol 13.3% Alcohols
	C-5042	25% Phthalo. Green	75% VYHH	
	5412	17.5% Phthalo. Green	17.5% VYHH	65% Methyl ethyl ketone
	2321	15% Phthalo. Green	31.2% Alkyd	5.1% Petroleum naphtha 54.9% Aromatic thinner
	1083	20% Phthalo. Green	16.0% Nitrocellulose (Visc. ½ sec.)	6.6% Toluol 34.4% Ethyl alcohol 23.0% Ethyl acetate
	5539	15.0% Phthalo. Green	30% Chlorinated Rubber	55% Toluol
	9047	15.0% Phthalo. Green	10.0% Ethyl Cellulose (Visc. 20 CPS), plasticized with 0.6% dibutyl phthalate	37.4% Alcohols 37.0% Ethyl Acetate
Sun Chemical	CVB-1001	50% Phthalo. Blue	40% VYHH plasticized with 10% dioctyl phthalate	
	CVB-1002	25% Phthalo. Blue NC	75% VYHH	
	CVB-1004	60% Phthalo. Blue NC	40% VYHH	
	PVB-1001	17.5% Phthalo. Blue	17.5% VYHH	65% Methyl ethyl ketone
	CVG-1001	50% Phthalo. Green	40% VYHH plasticized with 10% dioctyl phthalate	
	CVG-1002	25% Phthalo. Green	75% VYHH	
	CVG-1003	60% Phthalo. Green	40% VYHH	
	PVG-1001	17.5% Phthalo. Green	17.5% VYHH	65% Methyl ethyl ketone

SOLUBLE DYESTUFFS

SUPPLIER	PRODUCT NAME	TYPE OF DYESTUFF
Dupont	Pontamine Fast Turquoise 8GL	Direct
	Pontamine Fast Turquoise 8GLD Conc. 150%	Direct
	Luxol Fast Blue MBS	Spirit Soluble
General Dyestuff	Heliogen Blue SBLA (77269)	Sulfonated phthalo. blue
Wilson Organic	Direct Light Turquoise 8GL 100%	Direct
	Direct Light Turquoise 8GL 150%	Direct

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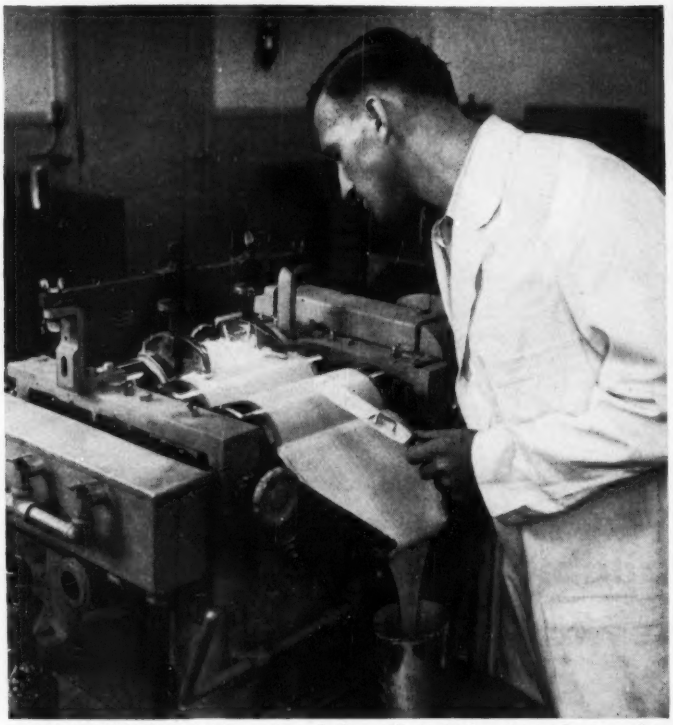
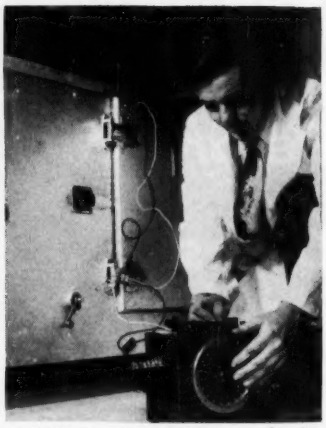
Company.....

Address.....

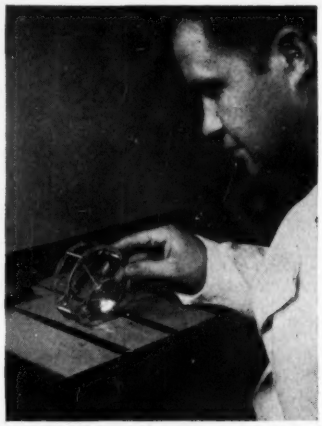
City..... *Zone*.... *State*.....



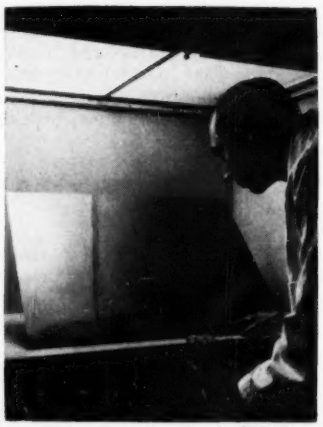
LABORATORY ROLL MILL, patterned after mills in CIL's paint works, is used to grind sample batch of experimental implement enamel in new laboratory.



CHEMIST reads potentiometer showing temperature of baking enamel.



HARDNESS, crucial property of finished enamel, is tested with Sward rocker.



COLOR is matched under daylight lamp in a completely black room.

Paint Push in Canada

At industrial York Township, just north of Toronto, Canadian Industries Ltd. revealed that it is placing greater emphasis on its paint and varnish business, reiterated its desire to help solve the problems of Canadian consumers through research carried out in Canada. CIL's double-barreled declaration suited the occasion—the formal dedication of the company's brand-new paint and varnish research and development laboratory.

On the site of CIL's York Works, newest of the firm's three paint plants, the recently unveiled laboratory is not one, but five separate laboratories, employs 60 chemists, engineers and technicians. Their efforts will be directed toward the development of companions to the more than 4,000 different finishing materials already produced by the company.

In the opinion of J. W. Brock, CIL's paint and varnish development manager, opportunities along this line have not yet vanished. He points to clear furniture finishes with greater mar resistance; new porcelain-like baking enamels that get around porcelain's high cost of application; house paints with entirely new standards of performance; improved electrical insulation coatings as examples of better finishes on the horizon.

Aside from their paint and varnish duties, CIL researchers have under their jurisdiction automotive and household specialties (anti-freeze, car polishes, household adhesives, etc.) development.

To implement this program, the new laboratory is endowed with 17,000 square feet of floor space and all the weapons of modern surface coatings research—right down to an accelerated exposure testing apparatus. Routine exposure tests are accommodated by 400 feet of outdoor racks which make up the laboratory's paint farm.

And, appropriate to an installation of its kind, the entire laboratory is color-conditioned "to provide a controlled mild stimulation to employees."

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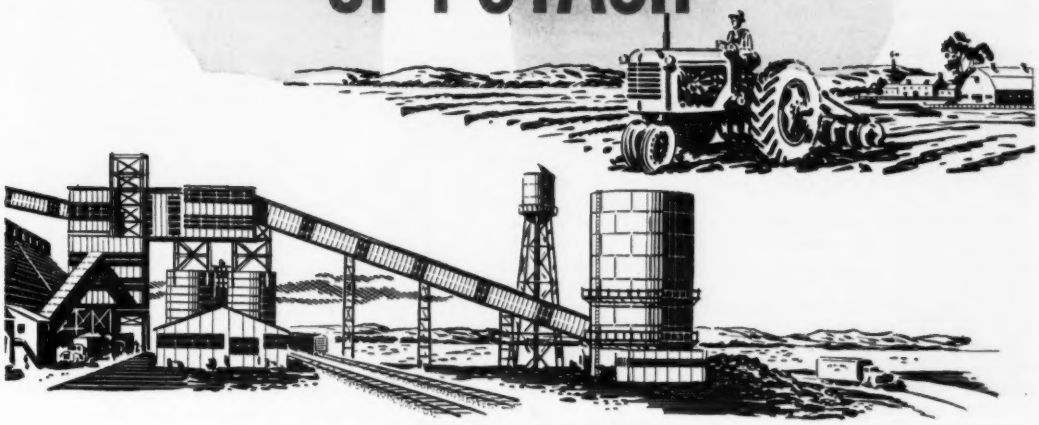

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Vanishing Breed

How are European commercial laboratories and private consultants faring? "Not so good," says Roger Truesdail, president of Truesdail Laboratories, Los Angeles, Calif. In an exclusive interview with Chemical Week, Truesdail—just back from a two-month-European sojourn—gave his candid estimate of the situation as he saw it.

As far as the Los Angeles consultant is concerned, Europe had something to learn and a thing or two to teach. During his journey through a half-dozen or more countries, Truesdail was both teacher—lecturing on "The Role of Commercial Laboratories in the U.S.A."—and student—learning of the plight of European consultants and commercial laboratories.

In the latter role he discovered a generally unhealthy climate for consulting organizations. Norwegian, Swedish and Swiss industry do not have a single commercial laboratory to call upon. The story in all these places is very much the same; traditional dependence on universities and increasing government control.

Sweden, for example, once had a number of independent consultants with private laboratory facilities. But with the growth of Swedish socialism, universities and government-supported institutions have taken over all testing, sampling, analytical work, etc. Today, not a single independent laboratory remains.

Switzerland boasts one engineering consultant. It has no commercial laboratories. Research, development and testing are controlled by universities and canton laboratories—local government labs that take private work.

Cease and Desist: The picture is considerably brighter in Holland and England. There are about 30 Dutch consulting laboratories that operate in a manner similar to their American counterparts. The British Isles have about 150 consultants, most of whom own their own laboratories. All are members of Royal Institute of Chemists which, in large measure, has prevented the growth of what the commercial laboratories call "unfair competition."

A member of a university or other non-profit institution engaged in competitive practices is likely to receive an RIC-inspired "cease and desist" order from his superiors.

Distrust as much as any other factor accounts for the paucity of private consultants on the Continent. To Truesdail, a Brussels industrialist put it this way: "Business executives won't trust a laboratory to keep their secrets. They are afraid that the laboratories will sell out to their competition." The Belgian explained: "Over here no one trusts anyone else."

•

Debut: Market development department of Commercial Solvents Corp. is now offering experimental quantities of N-methylglucamine—a potentially useful polyhydroxyamine. In general, the compound undergoes most reactions typical of secondary amines. Exception: It reacts very slightly, if at all, with nitrous acid. Below 150 C, the compound does not polymerize or dehydrate internally to any marked extent. Suggested applications are in the synthesis of surface-active agents, dyes and pigments, dyeing assistants and chemotherapeutics.

•

Aureo Insight: According to Lederle Laboratories (Div. of American Cyanamid Co.), the recently revealed structure of aureomycin explains some of the drug's workings: High oxygen content and amphoteric nature of the antibiotic molecule accounts for its good solubility in body fluids and lack of chronic toxicity effects. Lederle says the successful structural determination makes possible the synthesis of model compounds for biological study, claims "a practical synthesis of the antibiotic is highly improbable."

•

Brain Trust: J. R. Oppenheimer, director of Princeton's Institute for Advanced Study, Alexander Sachs, director of Lehman Brothers investment bankers, and Harold C. Urey (now with University of Chicago's Institute of Nuclear Studies) make up the first advisory committee of Walter Kidde Nuclear Laboratories—the first privately financed research organization for the development of commercial and industrial nuclear power.

•

Organized for Service: A new technical service is now being offered Canadian industry by British Columbia Research Council. Scientific assistance in planning research programs will be provided free to British Columbia firms.

•

British Sulfa: Ciba Laboratories, Ltd., has introduced a new sulfa drug in Great Britain. It's called Elkosin, is 4-(*p*-aminobenzenesulfonamido)-2, 6-dimethylpyrimidine. Also from Britain, comes word of a new high-yield synthesis of methionine. Researchers of Beecham Research Laboratories (Surrey) have developed a method of preparing the amino acid from β-methylthiopropionaldehyde via α-amino-γ-methylthiobutyronitrile and 5,2'-methylthioethylhydantoin.

Nitro Analysis: Researchers Jones and Riddick of Commercial Solvents Corp. get the credit for a new sensitive and specific method for the determination of small amounts of aliphatic nitroparaffins. It's based on the decomposition of the nitroparaffin to nitrous acid, treatment of the latter with resorcinol to yield a deep red-blue color. The technique has been adapted to the determination of halogenated nitroparaffin grain fumigants.

•

Work Cut Out: It's not so much the noise, but the varying pitch of sound that hurts peoples' ears. That's the conclusion of Douglas Dow, president and general manager of Detroit Testing Laboratory, Inc. Dow recommends that commercial laboratories get to work on a meter to test "noise annoyance" in addition to noise level as now measured by decibel meters.

•

Plowing it Under: Refuse penicillin will be one of the ingredients of fertilizer to be produced by a Danish plant now under construction. The development is the outgrowth of three years' experiments by Danish researcher W. M. Christensen. Christensen found that flowers and vegetables reacted favorably to doses of penicillin in the soil. He explains that the antibiotic destroys parasites, "strengthens the roots of plants."

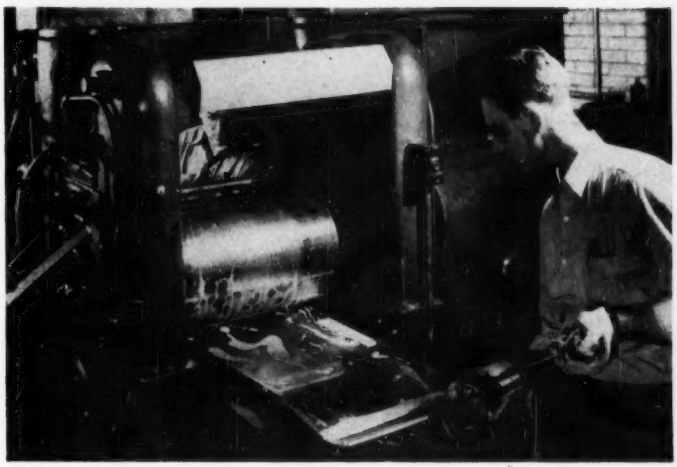
If Christensen's work is all that it's cracked up to be, Denmark's penicillin plants have the answer to their waste-disposal problems. In line with a newly issued patent, the refuse from Danish penicillin factories would be enough for 2,400 tons of fertilizer a year. Additional studies of the antibiotic waste as a fertilizer ingredient are now under way in Sweden and Finland.

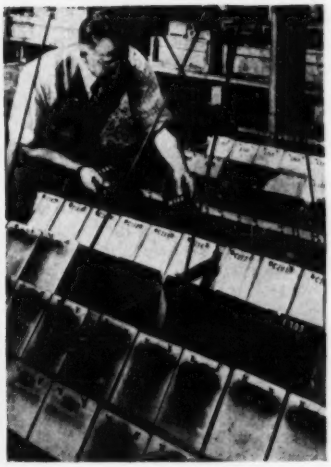
•

First: The first convenient route to a completely saturated lecithin has been found by University of Washington biochemists. It goes by way of catalytic hydrogenation of dipalmitoleyl--1-α-glycerylphosphoryl choline (from baker's yeast) to yield dipalmitoyl-1-α-lecithin, the corresponding completely saturated compound.

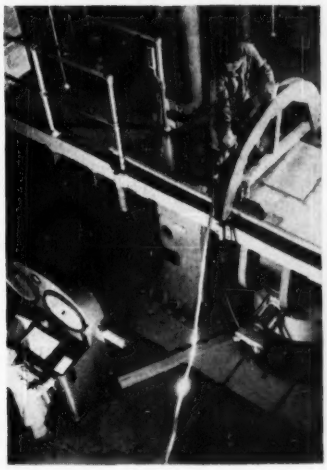
•

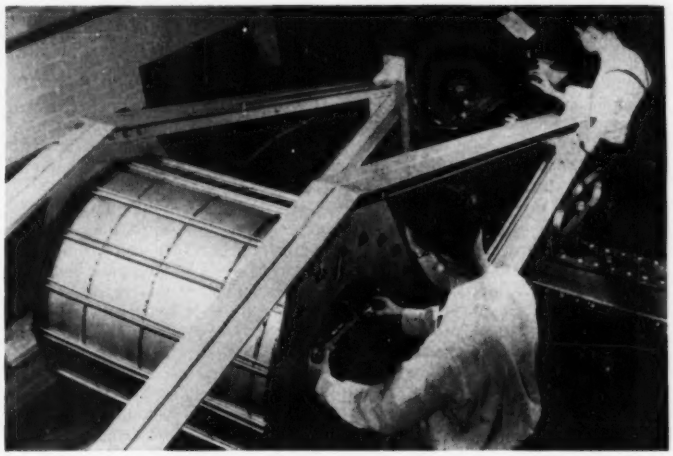
For Better Paper: Snyder Chemical Corp. (Bethel, Conn.) is launching a "beater addition" research program to concentrate on specialty papermaking investigations. The responsibility of a newly formed department, the program will emphasize phenolic resin-elastomer co-precipitations, also investigate applications involving the use of beater addition resins with a number of synthetic and natural latices.





ALUMINUM TESTING: Proving properties of strength, resistance . . .





. . . weight and performance that add up to . . .

More Aluminum in Process Plants

There's little doubt among production planners and forecasters but that aluminum has a big future carved out for itself. Planned output for 1954 is 1½ million tons. And the intrepid President's Materials Policy Commission (making its usual assumptions of population growth, continued world tension but no world war) thinks that U.S. demand by 1975 may hit a whopping 3.6 million tons. If that sounds like a big order, you have to remember that aluminum is a relative youngster among commercial metals, that production zoomed from nothing just 67 years ago to almost a million tons in 1950, doubled during World War II.

Just how this extra demand will break down is anybody's guess at this point. But one thing is clear: All three primary producers are wooing their fellow process companies with an eye toward snaring a bigger share of the market for materials of construction in process plants and equipment.

The reasoning behind their interest is fairly obvious, for the chemical process industries represent a big, growing market. It's a stable one, too, in sharp contrast to some of the present defense-born markets that could diminish overnight.

In any case, the three are busily engaged in research and market development that will have a direct impact on the process industries. Kaiser, with a brief background in the field, has now only one project to boast of—aluminum-laminated kraft drums (*CW, June 28*). It currently has several others under study, although results are not yet in.

Reynolds, too, is smack in the middle of a survey of the process industries. It is doing development work in cooperation with twenty different oil firms, says that results so far indicate the oil and gas industry may eventual-

ly become one of the biggest customers for aluminum. About 30% of the total cost of an oil refinery, says Reynolds, goes into heat exchangers. And aluminum has already made inroads on copper, steel, brass and bronze for that purpose.

Alcoa has had a long-standing interest in the process industries as an outlet for aluminum. Recently, it has come up with several items that, taken individually, do not appear too significant, but taken collectively, add up to a big step forward. Its latest development along those lines is Tube-Pak, a bundle of aluminum instrument lines held together in a bigger aluminum tube. Since Tube-Pak can be installed as a single unit and leads taken off at different locations, Alcoa thinks it should effect savings on labor, material, installation and maintenance costs.

Another recent advance is Alcoa's welded heat-exchanger tubes. By butt welding aluminum alloy sheet instead of drawing seamless tubes, it was able to pare the price by about 20%. It has also recently extended its Alclad aluminum alloy coatings to both sides of aluminum tubes to provide corrosion resistance on the inside and outside.

Stumbling Block: Aluminum can be joined by conventional methods of welding and brazing. But soldering aluminum is a different story, and here's why: Aluminum takes up oxygen readily to form a tough layer of aluminum oxide. The problem is finding a flux that dissolves the oxide coat but does not attack the aluminum. Also, the flux must be replaced by the solder at the joint, easily removed when the joint is made.

Another problem is prevention of pits caused by electrogalvanic action at the joint. That occurs whenever two dissimilar metals are immersed in a solution that conducts electricity. Since all the aluminum solders contain metals other than aluminum, the soldered joints are subject to it when moisture is present.

Successful solders and fluxes have been worked up but are not recommended for use under moist or corrosive atmospheres. Just recently, however, McCord Corp. (Detroit) has patented* a series of fluxes based on hydrazine. Applications are not confined to aluminum, but that's probably one of the biggest potential applications.

McCord is tight-lipped on the subject and the aluminum companies say it's too early to attach any commercial significance to it. But a lot of smart money is betting that it will get a careful examination by the whole industry.

Only by Comparison: Biggest selling points for aluminum are its price (18¢ a lb. for primary aluminum), light weight (one-third that of steel), high electrical and thermal conductivity (second only to copper among the common metals) and resistance to corrosion. But corrosion resistance—like up, down, hot and cold—is a relative term. Thus when the industry says aluminum has "good resistance to corrosion," it does not mean it's a panacea for all corrosion problems of process plants.

It's been used in various pieces of equipment in chemical plants for making ammonia, nitric acid, glycerine, alum, ammonium sulfate, sulfur, hydrogen peroxide, carbon dioxide and hydrocyanic acid. It is also resistant to many organic acids, has proved itself in fermentation plants for making acids (like citric) where it won't contaminate the product.

On the other hand, it is attacked by dilute solutions of nitric, sulfuric and hydrochloric acid, by caustic soda, caustic potash and by salts of a weak acid and strong base. Severe damage to the aluminum results when it comes in contact with mercury or mercury salts.

In the Cold: Another big plus for aluminum is its performance at low temperatures; for it seems to thrive in the cold, does not become brittle on exposure to temperatures as low as the boiling point of hydrogen (–432 F). In fact, elongation of one aluminum alloy is 80% greater at 305 F than at room temperature; tensile strength is about 70% higher.

That makes aluminum a prime candidate for use in tonnage oxygen plants. The McCarthy Chemical oxygen plant at Winnie (Tex.) was practically all-aluminum and the Carthage Hydrocol plant in Brownsville (Tex.) uses aluminum extensively. One estimate says that use of aluminum in such plants results in saving of 25% to 50% over other materials.

But at high temperatures, aluminum cannot compete with some of the other metals. It won't be used for any work involving temperatures over 400 F because stainless steel and other metals can do a better, safer job.

In general, all signs point to a more widespread use of aluminum in process plants over the next few years. It seems destined for wider use particularly in heat exchangers, instrument tubings, outdoor storage tanks. But it's in for some stiff competition from presently used metals and some of the fast-moving plastics.

* U.S. Patents 2,612,459 and 2,612,460.

TAKING FLASH POINT: Blinking lights tell the story.

In a Flash

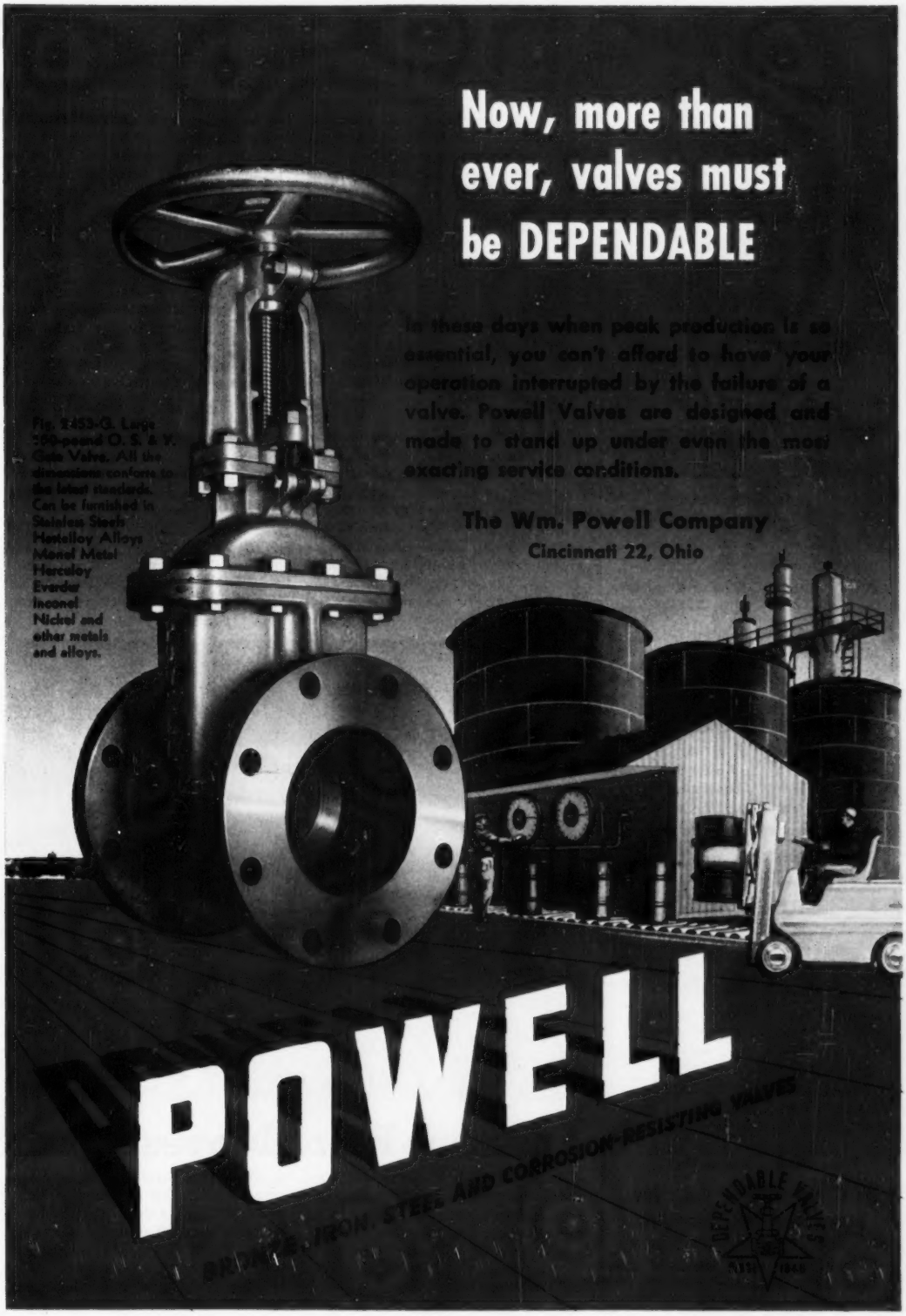
With an assist from Chicago's Precision Scientific Co., Standard Oil (Indiana) has installed an instrument that automatically determines flash point in 2½ minutes instead of the 20 minutes required for lab methods. It's currently being used by Standard to check outgoing shipments of petroleum products, but other applications in the process industries aren't hard to visualize.

The instrument was designed by Standard's Robert B. Jacobs, Evon C. Greanis and Don LoGiurato. Jacobs (technical director of the Engineering Research Department), who led the team, says that accuracy is comparable to that of best lab methods.

He adds that a number of commercial models have been in use by Standard for some time. And Precision Scientific, which built the first commercial model, has now obtained manufacturing and selling rights to the instrument.

Briefly, this is how it works: The instrument is set for a given flash point. A sample of the fluid to be measured is sent through a thermostatted metal block. An intermittent spark passing through the block raises the temperature gradually until the flash point is reached and the sample ignites. If the temperature at which it ignites is within the pre-set limit, a green light blinks, and a mechanism hooked up to the instrument stamps the shipper's ticket. A flash point that is below the limit is indicated by a blinking red light.

Standard's need for such an instrument is easily understood; for as Jacobs points out, even after the product has passed all tests at the refinery, there's always the chance that its flash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point may be lowered in storage, pipe lines, or transit. That means the flash point must be checked at several points. It also meant that a number of small labs had to be set up at the various distribution centers.

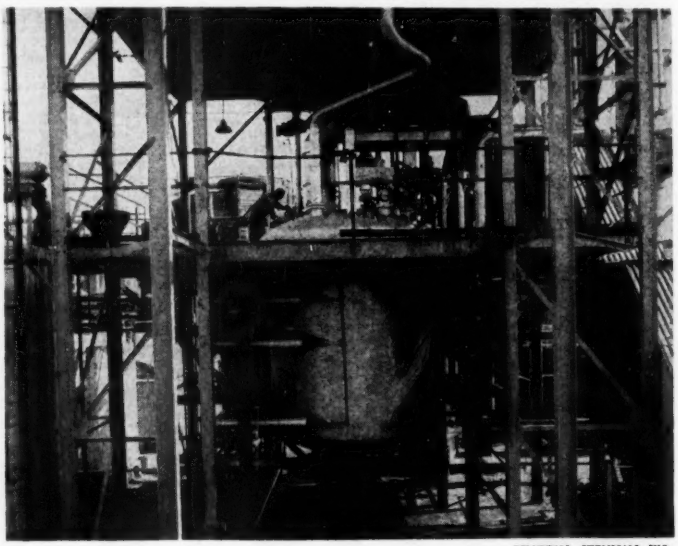
Standard claims the new instrument saves time and money, also avoids long delays for the truckers. And Precision Scientific is betting that it will prove just as valuable in product and process control on other volatile, flammable products.

EQUIPMENT . . .

New Manometer: It's not for everyday, run-of-the-mill application, but Fischer & Porter (Hatboro, Pa.) has brought out a new pressure-measuring instrument that's said to be as accurate as the most sensitive mercury manometer, but more rugged, easier to use. The firm claims that the instrument, dubbed the Press-I-Cell (for precise cell), has an accuracy of one part in 5,000; a sensitivity of one part in 15,000. Other claims made for the manometer: portability, temperature stability, resistance to vibration. Fischer & Porter is aiming it as a replacement for mercury manometers in cases where precision is a must. It also figures the instrument will find new applications where precise measurement has been impossible in the past. Specifically, it suggests its use in laboratories for calibrating other manometers, for precision measurements of altitude or barometric pressures; for measuring liquids in large storage tanks; for accurate measurements in the field.

•

Savings for Customers: A suggested standard for ac motors rated 1 to 30 hp. was approved by the Motor and Generator Division of the NEMA (National Electrical Manufacturers Association) this month. Covering polyphase, squirrel-cage, 60 cycle, open, 4-pole motors, the standard provides for more hp. for a given size frame. If followed, says the industry, it will result in weight and space savings for customers, also effect savings on strategic materials. It's the first step of a program that will develop standards for other speeds, other enclosures. NEMA standards are voluntary, however, and manufacturers are not compelled to adopt them in their own products.



REICHHOLD CHEMICALS INC.

Outdoor Plant Moves North

THE OUTDOOR PLANT, long popular in temperate climates—as typified by California and Texas—may now prove feasible in more severe climates—as typified by northern New Jersey. At least that's the fond hope of officials of Reichhold Chemical which has just spent $500,000 on the pictured synthetic resin kettle in Elizabeth, N.J. Capable of taking a charge of 50,000 lbs. of resin, the insulated kettle can cook it at temperatures up to 600 F. Officials think it may be the first outdoor kettle built anywhere, add that it's due for some close scrutiny by Northern industrialists.

special designs

IN FRACTIONATING TOWERS

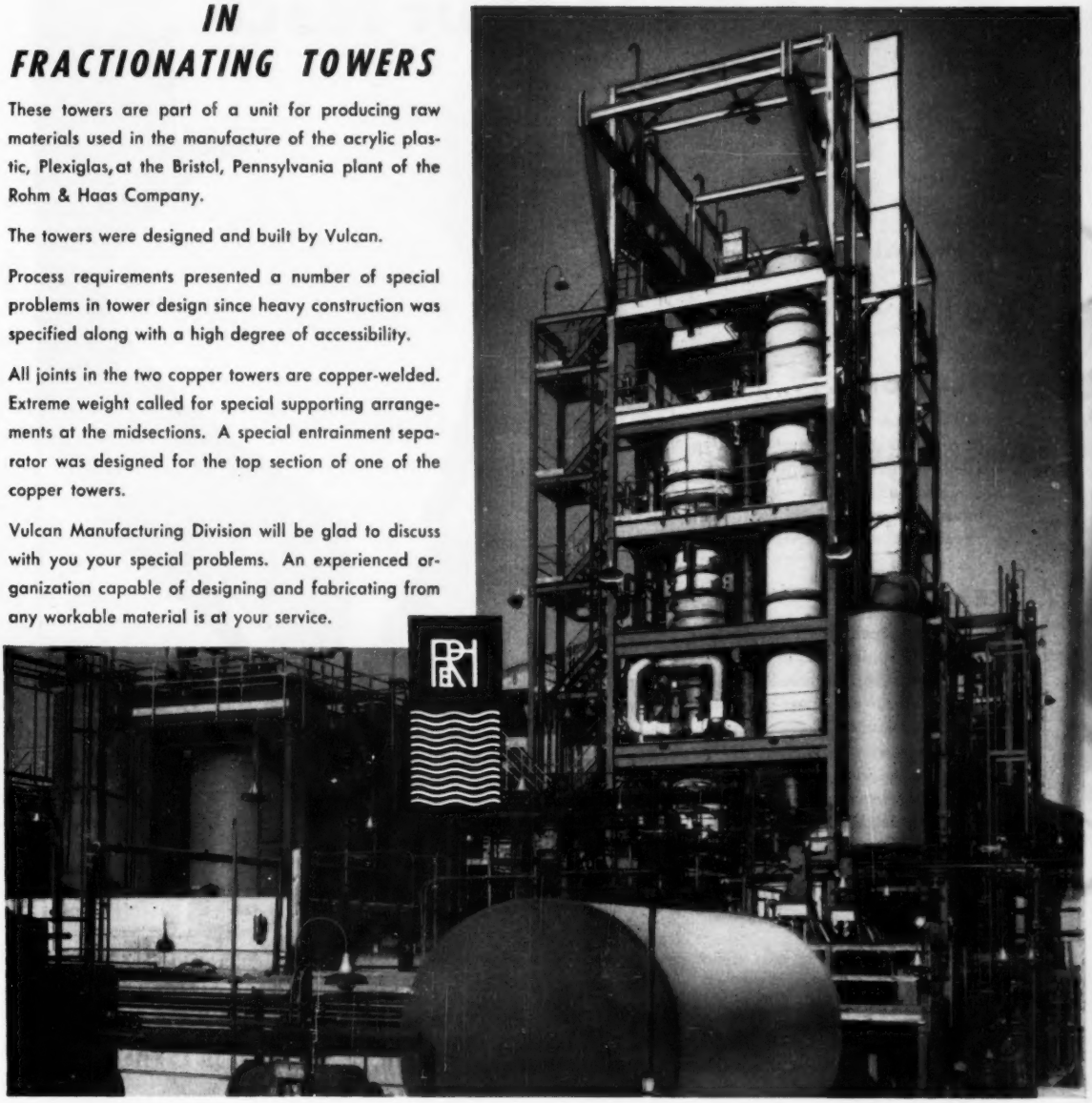
These towers are part of a unit for producing raw materials used in the manufacture of the acrylic plastic, Plexiglas, at the Bristol, Pennsylvania plant of the Rohm & Haas Company.

The towers were designed and built by Vulcan.

Process requirements presented a number of special problems in tower design since heavy construction was specified along with a high degree of accessibility.

All joints in the two copper towers are copper-welded. Extreme weight called for special supporting arrangements at the midsections. A special entrainment separator was designed for the top section of one of the copper towers.

Vulcan Manufacturing Division will be glad to discuss with you your special problems. An experienced organization capable of designing and fabricating from any workable material is at your service.



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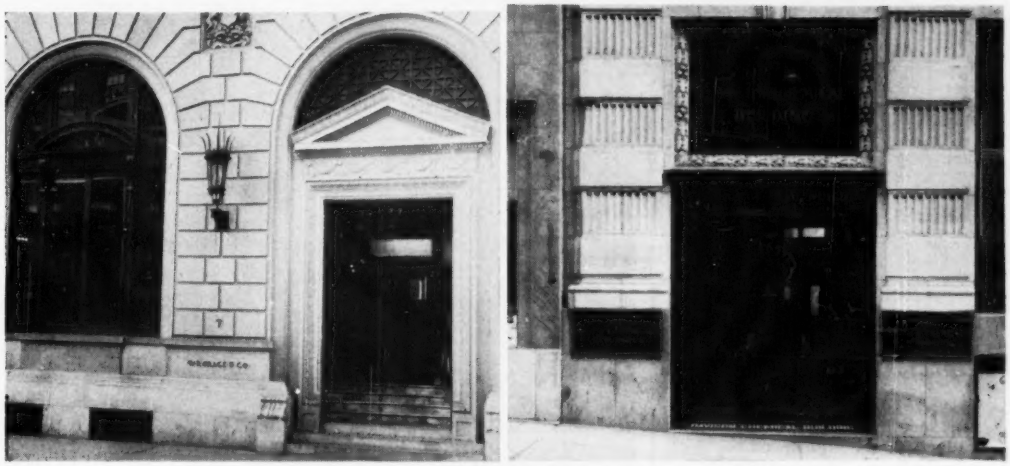


DOUBLE-DOOR POLICY: Horizontal or vertical negotiation?

Reading Between the Lines

In the kaleidoscopic picture of the chemical industry's rapid growth and development, it is sometimes difficult to keep track of all the details in the changing pattern. This is especially true when the information comes in the terse phraseology of a financial pronouncement.

Representative of this difficulty is the current speculation over the three-cornered relationship existing between W. R. Grace & Co., The Davison Chemical Co., and the new ammonia-urea plant which one or the other will build and operate at Memphis, Tenn.

The stage was set for this perplexity by a short item, carried by the financial dailies, to the effect that Davison and Grace had entered into an agreement whereby the former would act as a consultant for the latter on the technical details of building the new plant. This information came from a letter sent to Davison's stockholders. One news report, however, went on to say, in overly definite terms, that "the two companies also plan to enter into a further agreement whereby Davison would operate the plant for not less than two years . . . and would be given an option to buy it on terms to be agreed upon."

This, by itself, would not have wrinkled any brows. But coincident with it—and entirely as a coincidence—came W. R. Grace's announcement that it was setting up a new subsidiary, to be known as Grace Chemical Co., which would have the Memphis plant as its "first manufacturing unit."

The disparity, on the surface, between these two statements jibed with reports coming from potential Midwestern consumers and suppliers that there were two sets of market research men in the field—one from Davison and another representing Grace.

Here, however, is the true situation determined last week as the result of a CW inquiry.

Free Agents: In a nutshell, it can be said that both news items are correct—provided that they are read accurately. The words "plan to" do not necessarily imply that either party is "committed" to follow a proposed program. Moreover, Grace's chemical subsidiary could still claim the plant as its own—even though it is being operated under contract by someone else.

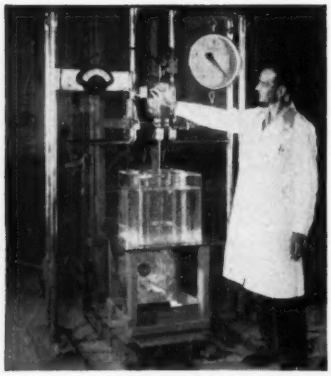
The most revealing facet is that Davison, despite the 18% stock interest held in it by Grace, is acting as a free agent in these contract negotiations. It is not, as one observer has remarked, "running errands as if it were a subsidiary working for a parent company." Instead, Davison is participating according to its own evaluation of what's best for itself. Up till now, this has included only the signing of a contract with Grace for "consulting services," covering both engineering and market research activities. This effectively delineates the relationship during the construction period for the new plant. In all probability, events during the coming year will dictate whether or not Davison becomes more heavily involved.

Chemical Convictions: Grace Chemical, on its part, is an expression of W. R. Grace & Co.'s intention to enter actively into chemical markets. Its activities will definitely not be limited to the Memphis operation. In fact, the embryo company is rapidly being fleshed out with additional personnel to give it the format of a going chemical concern.

It now has its own engineering department, headed up by John Carriere, formerly manager of the Engineering and Construction Division of AEC's Hanford Works. His staff will supervise the Memphis construction—with an assist from Davison engineers.

Market research on products to be made by the new plant is being carried on by the Chemical Development Department of the parent company. But the former manager of the department is now an assistant vice president of the chemical company; consequently the work is closely coordinated. Again, Davison men are participating in this work, the effort being split on the basis of determining which group can do the particular job most effectively.

A research program is being planned as an important phase of Grace Chemical's activities. This in itself, despite the possibility that Davison may operate the Memphis plant and distribute its products, is given as proof that W. R. Grace & Co. is not considering its chemical program as purely a financial investment. The prediction of this past spring that "Grace-in-the-U.S. is in chemicals for keeps" can be confirmed as a nearly accomplished fact.



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Self-Service Ships

SELF-UNLOADING vessels are in the news. An ocean-going version (*above*) has completed its first round-trip voyage for the Reynolds Metals Co., carrying bauxite from Jamaica. The other, a Great Lakes model, and the largest ship ever built in the state of Wisconsin (*below*), is completing its first season as a limestone carrier on the lakes.

The Reynolds Metals ship, "The Carl Schmedeman," is one link in an ocean-spanning materials handling project of imposing dimensions. The bauxite ore starts its journey from the Jamaican mines by making a six-mile trip cross-country to the island's northern coast in ton-size buckets suspended from an aerial tramway. Loaded onto the "Schmedeman," the ore will eventually be delivered directly to Reynolds' now-abuilding alumina

plant at Corpus Christi, Texas. For the present, it is being unloaded at Mobile, Ala., and shipped by rail to Hurricane Creek, Ark.

After the ship has been relieved of its 13,000-ton load by a complicated conveyor system which brings the bauxite out through the vessel's stern, it takes on fuel oil as cargo for the return trip. The oil is piped inland to the Jamaican ore-drying plant where it is used to fire the drying kilns. The "Schmedeman" is thus serving double-duty for its owner.

Not quite as versatile, but larger, is the "John G. Munson," newest addition to the fleet operated by the Bradley Transportation Line, a part of U. S. Steel's Michigan Limestone Division. About 21% of its deliveries this year have been to chemical plants, the balance going to steel and cement facilities. Hauling 22,000 tons per trip, its owners expect it to handle over 2 million tons next year, which will be the first full season for the vessel.

With a continuous belt conveyor under the hold and special air-controlled hopper gates, the "Munson" can unload itself at the rate of 5,000 tons an hour.

All the Way Up

U.S. Steel's new Fairless Works at Morrisville, Pa., is apparently supplying the needed punch for further development of the Delaware River basin as an industrial (and chemical) center (*CW, July 19*).

The channel above Philadelphia is being deepened to twenty-five feet, which will allow the steel company to bring its ore vessels from Latin America all the way up river to a plant-side unloading dock.

Meanwhile, ore is being unloaded in the Philadelphia port and transshipped by rail to Morrisville.

•

Anode Agent: Dow's magnesium anodes, designed to supply electrolytic protection for steel ship bottoms (*CW, Nov. 8*), will be handled by the Royston Laboratories, Inc. (Blawnox, Pa.), makers of protective coatings. The anodes, in the form of both slabs and extruded ribbons, can be used in the protection of a variety of underwater and underground structures, including pipe lines, piers, and the bases of steel transmission towers.

•

Funds Furnished: Recent MSA authorizations for Mutual Aid funds cover chemicals for France and Indo-China. Carbon black and other rubber additives take the bulk of the

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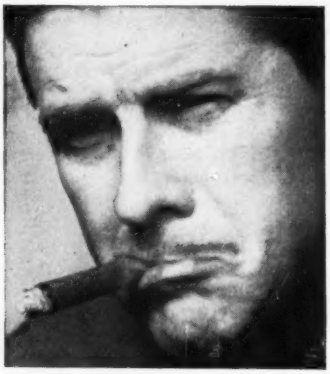

FRUSTROSITY* CASE No. 57:

Mr. Off Quality and his product are in real difficulties. If he had a 1952 Brookfield Viscometer at hand, he would know all the viscosity answers — *could make determinations directly in centipoises in a matter of seconds in lab, plant, or both.* Whether the materials you work with are Newtonian or non-Newtonian, you owe it to your wife, customers and co-workers to get up-to-date information on Brookfield Viscometers *adaptable to any problem from less than one to 32,000,000 centipoises.* Ask your Lab Supply House or drop a line to Dept. N, Brookfield Engineering Laboratories, Inc., Stoughton, Mass.

*FRUSTROSITY is that frustrated condition a man gets into when his problem is Viscosity Determination or Control and he hasn't asked BROOKFIELD.

DISTRIBUTION . . . . . .

French allocation, while the Asian country will receive, in the main, materials for small-sized paint and soap factories.

•

Copper Kraft: The Kraft Chemical Co. (Chicago, Ill.) has taken over as an exclusive sales agent for the Copper Pigment & Chemical Corp.'s production of copper cyanide at East Newark, N.J. All material will be packaged under Kraft's Kaynide Division label, and stocks will be maintained at both Chicago and East Newark.

•

Five to Three: The Ethyl Corp. has realigned its research-service organization at its laboratories in Detroit. Heretofore the work has been divided among five divisions. These have been regrouped into just three units: One of them, the newly created Product Application Division, will handle technical service and engineering research. The rest of the work is split between the Automotive Products Research Div. (additives, deposits, and engine combustion) and the older Chemical Research and Development Div., which will remain unchanged.

•

Simple Strip: Designed so that it can be operated by just one worker, a new strip-packaging machine is now being offered by the McKay-Davis Chemical Corp. (Toledo, Ohio). Known as the Donofrio Strip Pak, it will encase 600 pills, capsules, or tablets per minute in cellophane, pliofilm, aluminum foil, or other heat-sealing materials.

•

Insulating Brick: The Zonolite Co. (Chicago) has introduced a new firebrick made out of vermiculite and clay binders. Its prime feature, the manufacturer claims, is its low thermal conductivity, making it suitable as a back-up insulation for refractory brick in the service range up to 1,800° F. It may be used as facing brick, however, in situations where it won't be subjected to mechanical abrasion or exposed to molten slag or metal.

•

One Man's Poison . . .: J. T. Baker Chemical Co., producers of reagent-grade chemicals, has discovered a hitherto unpublicized use for its Baker-quality sulfuric acid. Now its officers are wondering how to expand the market. Typical present consumption rate: Detroit's police department used 10 cc. of acid for each of 230 tests last month. The test, performed on hapless Detroiters: examination by Drunkometer.

With a Starkly Modern Air

PICTURES are worth a thousand words, the old saw goes, and American Cyanamid apparently subscribes to the thesis wholeheartedly. Its Coated Resins Department has chosen an art-exhibit theme for its display at the Paint Industries Show held last week. Each of the modern-style paintings is meant to highlight one of the advantageous characteristics of Cyanamid resins. Their titles are sufficiently enigmatic to perpetuate the modern touch. Here are a few of them: *Lightning Speed, Study in White,* and—with art-colony understatement—*Perspective in Deep Tone Colors.*

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Picolines
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The De Nora Cells At MUSCLE SHOALS

The De Nora cells at the new Government-owned, Monsanto-operated chlorine plant, Muscle Shoals, Alabama, are eloquent testimony to chemical engineering progress.

Uniformly high quality GLC GRAPHITE ANODES are doing their share to help the electrolytic industry meet the ever-increasing civilian and defense demands for chlorine and caustic soda.

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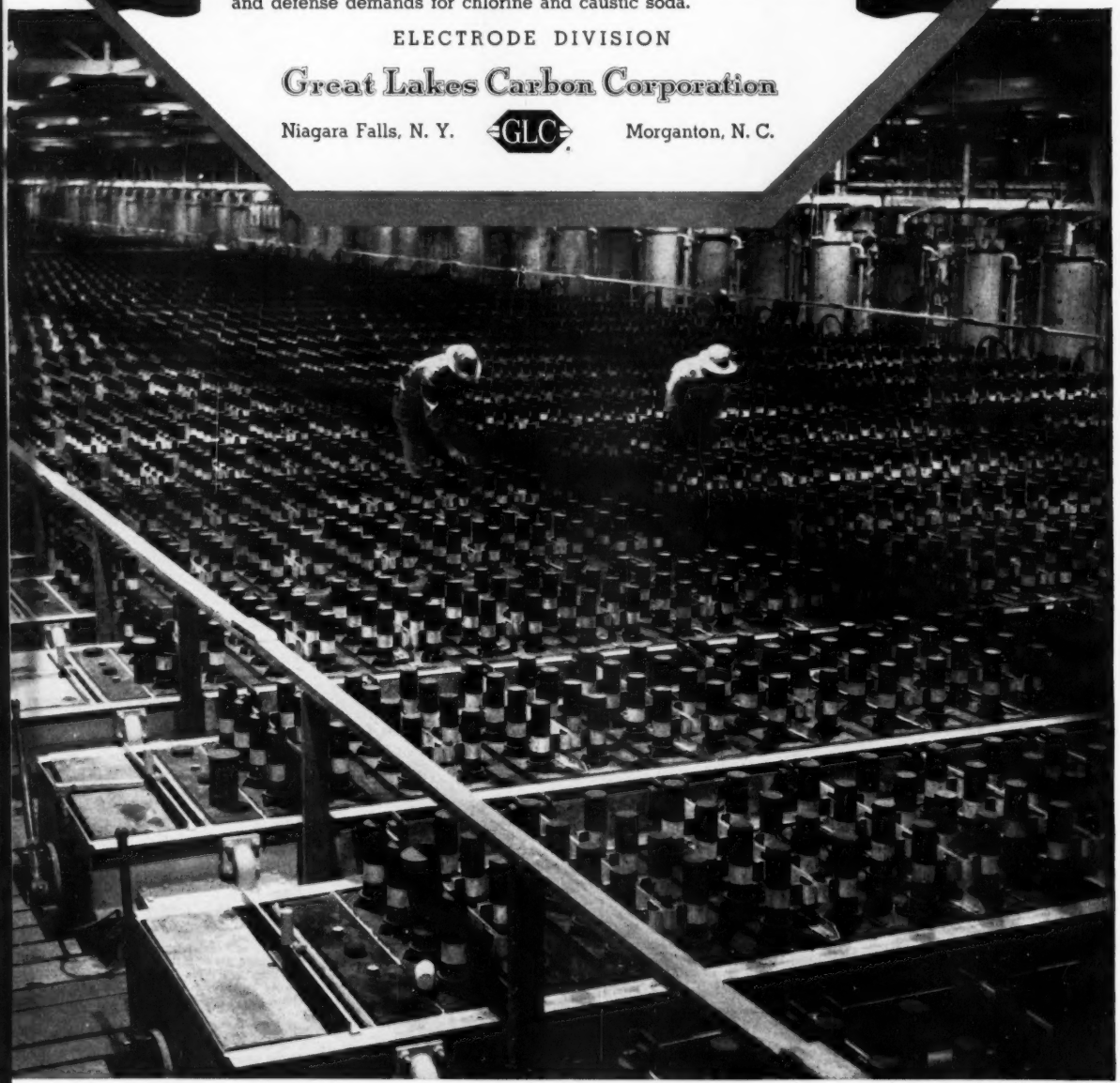
Great Lakes Carbon Corporation

Niagara Falls, N. Y. GLC Morganton, N. C.



Courtesy Monsanto Chemical Company

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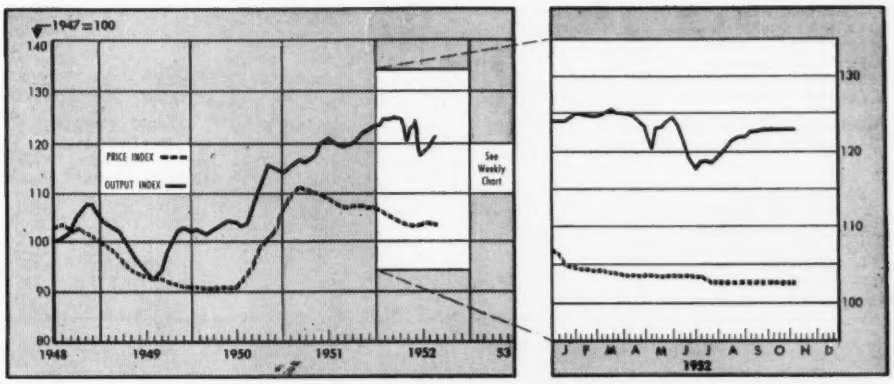
MARKETS . . . . . .



CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

MARKET LETTER

Don't look for a benzol ease for a long time. The loss of 30 million gallons during the coal strike was apparently just enough to tighten the market, make rising demands from plastics makers immediately felt. Help from petroleum benzene is still too little, too expensive.

If the whispered gray-market price is any signal, pyridine is easing a bit. Quoted in the trade a short while ago at $2.10 per pound, it can now be had from resale sources at about $1.85 (vs. the producers' price of $1.05). Whether this change ties in with the recent drastic cuts in the isonicotinic acid hydrazide price is an interesting speculation; demand for pyridine for making the drug is reported softening.

Regardless of the present market, relief is predicted by late spring. Synthetic pyridine sources, with an estimated 500,000 pounds annual capacity, are planned to go onstream within the next few months.

Phosphate rock, generally low in supply for some time, may get worse before improving. Producers forecast demand, now steady, may become much stronger during the usual spring rush. Whatever inventory build-up can be made now, they predict, will be needed domestically.

Result: Exports, now tight, will be delayed even further.

Canada has now taken the controls off sulfur. This move, following closely upon similar action in U.S., was not unexpected. Most of Canada's sulfur supplies come from this country.

Elsewhere, in sharp contrast, the sulfur picture is more gloomy. The Organization for Economic Cooperation survey of sulfur in Europe predicts a 200,000-ton annual deficit by 1955. Reason: rapid rise in demand coupled with pyrites-supply uncertainties.

The soybean oil price advance, according to some informed sources, may soon expend itself. Although a more gradual rise may materialize in the next few months, the feeling is that little further advance may be expected for the short-term.

Phthalic anhydride, after a great September surge (attributed to abnormally low consumer inventories) is now holding at a satisfactory demand level. Producers expect December to be an active month, look forward to steady sales for some time to come.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	$ 124.2	$ 123.7	$ 124.5
CHEMICAL WEEK Wholesale Price Index (1947=100)	102.3	102.3	106.7
Bituminous Coal Production (daily average, 1,000 tons)	1,821.	1,800.	1,523.
Steel Ingot Production (1,000 tons)	105.5	106.5	104.0
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	250.6	242.8	222.7
Chemical Process Industries Construction Awards (Eng. News-Record)	$2,191,000	$2,212,000	$2,079,000

MONTHLY INDICATORS—TRADE (Million Dollars)	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	$23,647	$21,873	$20,892	$43,151	$43,107	$42,067
Chemicals and allied products	1,589	1,473	1,441	2,987	3,022	2,971
Paper and allied products	700	667	689	976	972	925
Petroleum and coal products	2,128	2,003	1,994	2,821	2,728	2,620
Textile products	1,126	1,058	1,067	2,835	2,798	3,409
Leather and products	280	282	245	550	543	705

Quick on the heels of the ethyl alcohol price drop, two producers of isopropyl alcohol lowered their prices 3 cents a gallon to 35½¢ (91% grade). A third large producer, when queried, was mum, quoted 38½¢ as current.

Norway will benefit from a large-scale expansion program by the chemical concern Norsk Hydro. The company is increasing its manufacture of nitrogenous products, will employ a new electrolytic process. Other expansions are for fertilizers, urea and magnesium. In addition, new construction for carbide and phosphorus is planned.

High-solvency naphthas continue short as demand increases. Reason given for this tight state: Commitments made by steel companies, and not met due to the strike, still plague industry. One large supplier reports that sales continue to take all stocks on hand.

Sodium nitrite producers are not expecting the present sales spurt to be prolonged beyond usual seasonal demand. After "black-dyeing" time ends and textiles turn to the color and pastel season, sodium nitrite sales are expected to drop back.

Producers agree that phosphoric acid is in good demand, are unwilling to ascribe the higher take to any particular cause. Two reasons now current: low consumer inventories, general business pick-up.

Odorless thinners are beginning to hit their pace. One producer, who has been offering the material for only two months, reports that its reception has been more than satisfactory. As expected, the main interest is from solvent-base paint makers who are fighting a battle against the increasingly popular latex-base lines. No-man's-land is the home, hospital, and general interior markets where smell, or the lack of it, is important.

One coal-and-coke chemical may be already enjoying a price boost under the new, higher OPS ceiling. Anticipated as an early riser under the new grant, one producer of ammonium sulfate is reported to be quoting a price up $4.50 per ton—about 10%. The continuing tight sulfate market should keep the pressure in that direction.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending November 24, 1952

	Change	New Price		Change	New Price
UP					
Glycerine, crude, saponification, lb.	.015	.30	Soybean oil, crude, lb., T/C	.0025	.12
DOWN					
Lead, metal, lb., c.l.	.0025	.1425	Alcohol, isopropyl, gal. (91%), T/C	.03	.355

All prices per pound unless quantity is stated.

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I-Bar Rolling Hoops—two 1" x 1½" hoops take the handling shocks—protect seam and bung from damage.

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Two-Piece Construction—eliminates chime and longitudinal seams. Formed from two seamless, cold drawn shells, joined by a single circumferential weld.

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Choose Hackney 2-Piece Acid Drums for safe, low-cost shipments of sulphuric acid, aqua ammonia, caustic potash, hydrofluoric acid or other special chemicals. Write for full details.

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CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

How PROSPEROUS Is The USA?

Just how prosperous *are* the people of the United States?

The sole purpose of this message is to help clear up the confusion and controversy that surrounds this important question.

To find out how much prosperity, or material well-being, the people of the United States now enjoy, it is necessary to get answers to these questions:

1. As compared with other times, what is the total amount of goods and services that we have available for our enjoyment?

2. How great, on the average, is the share of each American in this prosperity?

3. How does our prosperity compare with that of other nations?

National Product at Peak

The government statisticians who do the bookkeeping for the nation produce a figure called the Gross National Product. It is supposed to be the total obtained when you multiply the amounts of everything we produce by the prices of everything produced. This year the GNP, as it is commonly tagged, will add up to something like $345 billion.

Since this will be the highest total that GNP has ever attained, some people will acclaim it as evidence that we now are enjoying the greatest prosperity on record.

The GNP, however, is not an accurate yardstick of prosperity. It may go up because of price inflation alone without any increase at all in the output of goods and services. Also the GNP includes very large amounts of goods and services, such as those for the military, which are in fact a result of misfortune rather than of a condition that might properly be called prosperity. Moreover, there is no deduction from the GNP to make allowance for the equipment that is worn out in producing it.

Little Recent Progress

When we make adjustments such as these — to find out how much of our production really is available for the use and enjoyment of the civilian population — the *adjusted* national product since the beginning of World War II comes out about as follows. The effects of price inflation have been removed from these figures.

YEAR	ADJUSTED NATIONAL PRODUCT	
	Billions 1951 Dollars	Index (1946 = 100)
1940	$176.2	76
1946	232.5	100
1947	240.7	104
1948	244.3	105
1949	239.7	103
1950	260.9	112
1951	267.9	115
1952	264.3	114

From this table the fact stands out that progress in raising our level of prosperity has been halting. What progress we have made came in a few dramatic increases before or after a military build-up. Aside from those, the progress has been fairly slow. This year, 1952, it has been particularly discouraging.

Again, when account is taken of the number of people who must share in the goods and services that are available, our progress is even less marked. This is shown by the following table which gives the share of the average American in the national product. This, as the table indicates, is arrived at simply by dividing the total of available goods and services by the population on hand to share in them.

YEAR	POPULATION Millions	ADJUSTED NATIONAL PRODUCT Billions 1951 Dollars	ADJUSTED NATIONAL PRODUCT Per Person
1940	132.0	$176.2	$1,335
1946	141.3	232.5	1,645
1947	144.0	240.7	1,672
1948	146.6	244.3	1,666
1949	149.2	239.7	1,607
1950	150.6	260.9	1,732
1951	154.4	267.9	1,735
1952	156.9	264.3	1,685

Here it is clear that we have made little or no headway since the end of World War II.

U.S. Compared to Other Nations

Although we are making slow progress in increasing our prosperity, as measured during recent years by the amount of goods per person, we still are by long odds the most prosperous people on earth. This can be seen from the following table. It offers a rough measure of how the adjusted output of goods and services per person in the United States compared in 1951 with that in a number of other countries:

COUNTRY	PER PERSON
United States	$1,735
Canada	1,231
United Kingdom	614
France	510

To figure more closely "How Prosperous is the U.S.A.?" we must answer a number of other questions. One of the most important will be the subject of a later editorial in this series. It is "Who Gets What?" How have various income classes and occupational groups shared the total available goods?

Another question that has a basic bearing on the quality and durability of our prosperity is "How fast are we using up irreplaceable natural resources, such as oil, iron ore, and copper, to sustain it?" Any attempt to deal with this very complicated question must also be deferred.

A Problem for the Future

In the meantime, however, key facts about our prosperity are that:

1. Most of the increase in the nation's total production in recent years has been to meet military requirements rather than to improve the American standard of living.

2. The increase in the supply of goods and services actually available for the average American has been slow and halting.

3. We Americans are still extremely well provided with the good material things of life, as compared with peoples in other lands.

These three facts bring to mind a whole series of policy questions. What can be done to speed up progress in improving our prosperity? What—to repeat the question discussed in the previous editorial in this series—can be done to make our prosperity less precarious?

Here, however, the purpose is not to prescribe. It is simply to indicate as accurately as it can be done in a brief article the actual state of the nation's prosperity.

In doing this much, it can properly be remarked that the record presents to the American economy both a problem and an opportunity of surpassing importance. It is that of building a prosperity that will be both more progressive and more secure than any we have known in recent years. In the light of what clearly remains to be done, we shall make a grave mistake if we use up any of our energy in congratulating ourselves on the relatively meager progress here recorded.

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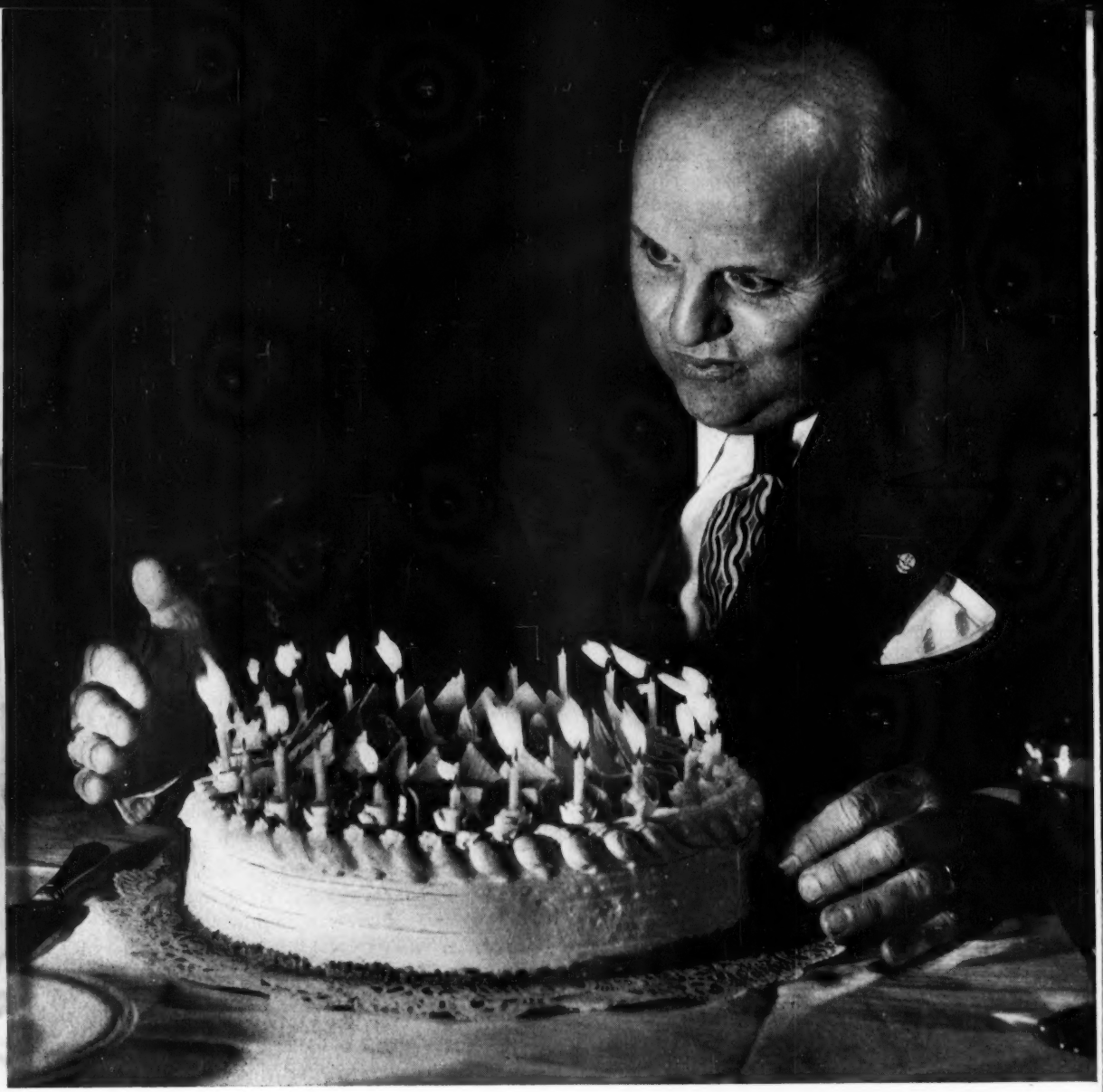

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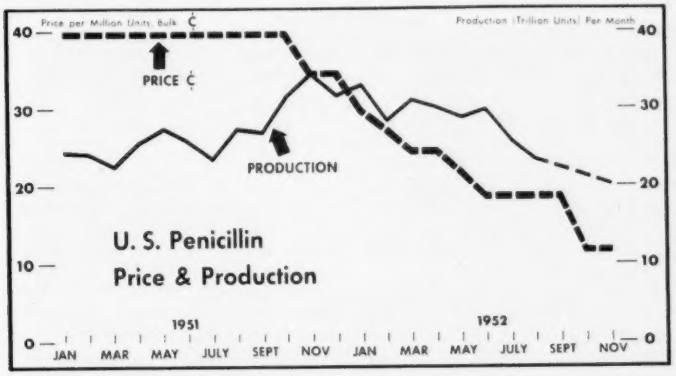

Penicillin's Awkward Age

The original "wonder" drug, now passing through a painful readjustment, is nearing an era of economic stability.

"We're getting down to costs. There will be a definite leveling off at 10-12¢. Some people will have to get out of the business. Then the price many edge back up—but not far."

This terse summary came last week from a spokesman for one of the larger penicillin producers. And behind his remarks is the quiet determination of other basic producers—those who intend to ride out what they hope is the trough of the price wave.

For although still therapeutically a "wonder" drug, penicillin has passed from the prodigy stage. It is now approaching maturity, economically speaking.

O course, whether penicillin producers, or most of them, are actually "getting down to costs" is not easily ascertained; no secret is more jealously guarded. And besides, variations in costs among companies that were insignificant, percentagewise, at a higher selling price may become critical differences under today's market conditions.

Into the Act: Back in 1944, everyone knew penicillin had a great future. Some of the largest drug houses threw money into almost any kind of equipment in order to cultivate this drug which was saving countless thousands of lives.

It was only five or six years ago that penicillin sold for 50 times today's price. It was then that some makers made the discovery that the mold need not be laboriously (and expensively) collected either from individually inoculated flasks or innumerable trays in rigidly controlled, specially conditioned chambers.

The race for the penicillin market was on in earnest once the deep-vat culture method was proved. So fast did producers move into the field that by early 1950, penicillin, a rank newcomer to the drug industry, was already known to be "long." But with prices still far above costs, the incentive to be in the act was much too strong to resist.

Then, just a few weeks before Korea, a buying wave touched off a shortage that was to last well into 1951. Small wonder, then, that the news for the next few months was sprinkled with such items as:

- May, 1951—"Bristol will add 40,000 square feet to its (penicillin) plant over and above expansion plans announced some time ago."
- July, 1951—"Merck expects to start production of penicillin at Danville, Pa., next month."
- September, 1951—"Schenley will boost production by 30% at Lawrenceburg, Ind."
- December, 1951—"Lilly receives a 50% write-off for a $19 million penicillin plant at Lafayette, Ind."

And so the industry arrived at its present 500-trillion-unit-capacity mark. But at the same time it watched the price drop to its current 12 cents per million units—only five short years away from the $3-per-million-units antibiotic of 1947.

Export Fading: Despite the tremendous, and obvious, boost in capacity, some observers point to other factors as contributing to the price slide. Loss of exports is one such whipping boy.

But the facts of the record tend to substantiate those that discount this factor. In 1951, exports actually increased, yet falling export prices negated the gain. Here are the figures:

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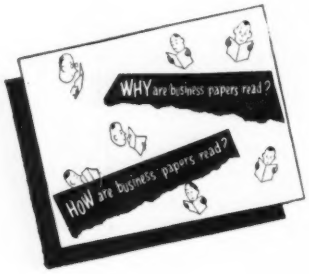

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Penicillin Exports

Year	Trillion Oxford Units	Value, millions	Percent of U.S. production
1950	68.7	$46.4	30.9
1951	83.9	48.2	25.7
1952 (est.)	75.0	22.0	20.0

The picture for 1952 is much dimmer than last year's; not only is the price further depressed but the amount of material will probably fall short of the 1951 peak.

This quantity drop, however, should be neither surprising nor depressing. In several instances, United States firms—setting up shop in other countries—are directly responsible for this export decline. Three such nations (and the U. S. firms): Argentina (Squibb); Brazil (Wyeth, Squibb); and Spain (Merck).

As a consequence, many feel that so far as U. S. producers are concerned, the export loss is not truly significant. At least, these people argue, it could not possibly account for the drastic price drops.

But granting that the romance of the industry has worn off, producers who intend to stick with penicillin are helping themselves by promoting more elegant preparations (a pharmaceutical term); and pushing animal-feed supplements.

• In devising elegant preparations, some makers are developing new or novel forms for utilizing the value of penicillin. For example, they may combine penicillin with streptomycin, sulfas, or other drugs to give a multiple-value preparation. The increased sales value due to the inclusion of the penicillin is often greater than the mere added value of the material.

• Volume-wise, the future of penicillin may well lie in other fields. Animal-feed supplements are already accounting for a $20 million annual antibiotic total. One well-established maker predicts a $50 million market for penicillin in animal feed supplements within the next couple of years.

There are also other courses for hard-pressed producers. Finding themselves operating close to cost, they can often convert their equipment over to other antibiotics—provided, of course, they can find others. At least one big-name producer has quit making bulk penicillin altogether. Should other companies follow this course, it looks as though they will be leaving penicillin to the few low-cost manufacturers who can carry on now that the wonder drug has come of age.

Who Makes Penicillin Where

COMPANY	PLANT LOCATION
Abbott Laboratories	N. Chicago, Ill.
J. T. Baker Chemical Co.	Phillipsburg, N. J.
Bristol Laboratories	E. Syracuse, N. Y.
Commercial Solvents Corp.	Terre Haute, Ind.
Cutter Laboratories	Berkeley, Calif.
Heyden Chemical Co.	Princeton, N. J.
Lederle Laboratories	Pearl River, N. Y.
Eli Lilly & Co.	Indianapolis, Ind.
Merck & Co.	Danville, Pa. Elkton, Va.
Chas. Pfizer & Co.	Brooklyn, N. Y. Groton, Conn.
Schenley Laboratories	Lawrenceburg, Ind.
E. R. Squibb & Sons	New Brunswick, N. J.
U. S. Industrial Chemicals Div.	Baltimore, Md.
Upjohn Co.	Kalamazoo, Mich.
Wyeth, Inc.	West Chester, Pa.

PAIN RELIEVERS: More than $130 million yearly for salicylated soothing.

Internecine Strife

With a $136 million market at stake, aspirin producers are stepping up the campaign to anchor their hold on the U. S. painkiller sales.

Heavily promoted aspirin-in-combination formulations and buffered aspirins have bitten deeply into the market. . .

And newer analgesics, including "rediscovered" salicylamide are swiping a slice of the profits pie, too.

"You can't beat straight aspirin for simple home medication." That's the prescription being pushed this week in Bayer Aspirin's current advertising campaign. And since this Sterling Drug division has historically put its main emphasis into selling the "Bayer" name, it's a clear indication that strong undercurrents are flowing in the massive painkiller market.

It's a market worth fighting for. The sale of pain-relievers is big business—a $136 million annual business, according to one recent survey.* It explains why Bayer, as the leading seller of brand-name aspirin, intends to do what it can to keep as much as possible of the multimillion-dollar market in the straight-aspirin backyard—even though its advertising copy benefits its host of straight-aspirin competitors.

Five-Grain Future: In a sense, the Bayer program may be regarded as sort of insurance plan. The sales of common, five-grain aspirin tablets have managed to maintain close to 30% of the total analgesic sales for the past few years (28.5% in 1949, 28.7% in '50, 29.3% in '51, according to Drug Trade News). That's pretty good for a pill that has retailed for as low as 4¢/100 tablets in many chain drug stores.

But one of the aspirin-plus compounds that has been gaining in popularity in the past few years, and which might have something to do with Bayer's precautionary measure, is Bristol Myer's Bufferin. Shrewdly promoted, this compound, containing two buffering agents to lessen possible aspirin side effects, has proved to be the most popular of the buffered aspirins yet on the market—and there have been many during aspirin's long tenure on the druggist's shelves.

Salicylate Understudy: Aspirin-containing compounds aren't the only contenders, however. Salicylamide, another salicylate related to aspirin, has been waiting in the wings for half a century to make its bow as an analgesic.

Also known as *o*-hydroxybenzamide, it has been offered in this country as a painkiller at various times in the past thirty years, but only in the past two years has it caught on with the consumer public. Some of this slowness in taking hold might be attributed to the heavy push Bayer originally gave aspirin—to the exclusion of other salicylates uncovered about the same time. Another holdback has been cost; it's roughly twice the price of acetyl salicylate now, will likely remain high.

There seems to be evidence, however, that salicylamide has advantages over its cousin that may permit it to take over more of the aspirin business. One maker (key producers are Chemo Puro, Long Island City, N. Y.; Monsanto; and Dow, probably in that order) figures production is roughly about 1% that of aspirin today, claims the higher potency (four grains do the work of five of aspirin), better flavor, and greatly lowered toxicity tag it for a big increase.

Salicylamide is produced in quantity in Europe, is widely sold there in various remedies. It appears to have taken hold there much more firmly than in the United States, although use here is on the upswing. The salicylate is in numerous ethical products now, as well as in over-the-counter rheumatism medicines such as Kordol Corp. of America's (New York) Kordolin. Straight salicylamide pills for simple headache relief aren't yet available.

Soothers Too: There are some people who cannot take any of the salicylates, however, without gastric upset, skin rash, etc. For these, to whom the salicylate caress isn't soothing, several other compounds have been developed. Long used have been phenacetin (acetophenetidine), well known for its fever-reducing and analgesic properties. Another oldtimer is acetanilide.

One of the most recently introduced analgesics (not narcotic) for those who cannot tolerate salicylates is N-acetyl-*p*-aminophenol. Ames Co., Inc. (New York), wholly owned by Miles Laboratories, put it on the ethical market a short time ago under

* For statistics on the rapid growth of aspirin production, see CW's tongue-in-cheek graph c correlation between it and the cost of living *(CW, Sept. 13)*.

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the trade name Apamide, offers it also, in combination with a sedative, in Apromal formulations.

Another strictly ethical compound is Geigy Pharmaceutical Co.'s Butazolidin. Chemically 3,5-dioxo-1,2-diphenyl-4-n-butylpyrazolidine, it has just been introduced for arthritis treatment, and is claimed to be more than just an analgesic. Geigy sells it in finished form only, on prescription.

Also widely used are compounds which lower the nerve fiber conductivity—act narcotically. These are seldom available for over-the-counter sales.

Morning-After Aids: Some marketing studies appear to indicate that home-use analgesics tend to be straight aspirin; that formulations of aspirin with caffeine, phenacetin and sodium citrate—or antiacids—rate the away-from-home sales.

Bromo Seltzer, Emerson Drug Co.'s widely known pain reliever (principal ingredients: sodium bromide, acetanilide) has well established soda-fountain sales. Miles Laboratories' Alka Seltzer (aspirin-based) is another with extensive one-shot sales.

Typical of the other aspirin-in-combination products competing with straight aspirin are Stanback Co.'s Stanback and B. C. Remedy Co.'s B. C. Headache powders. Various so-called arthritis remedies are largely aspirin, and more than one has received a wrist slapping from the Federal Trade Commission for overplaying powers of that wonder drug—acetyl salicylic acid.

Despite the occasional borderline product, few medicines have built such a solid reputation for themselves as aspirin. Out of the Bayer medicine bag years ago, it's found now in nearly every home, in almost every office desk. Even though it has been around too long to warrant the "miracle drug" label, other analgesics will have to go a long way to match its acceptance in the painkiller market.

Mileage Booster for Breeches

WAXING PANTS, a horrifying thought to shine- and crease-conscious Americans, is the latest trick in the Tyrol. At Salzburg, Austria, a couple of shrewd young men enlist aid in applying the paste wax to their lederhosen, or leather pants, traditional mountain garb.

But there's more to it than laughs; these leathern breeches are expensive, greatly treasured garments. The owner expects years of wear—and has found that a treatment of paste wax makes them softer, more supple, and much longer wearing. Makes a good picture, too.

SPECIALTIES . . . . .

Firmer Grounding

One company's efforts to banish the fog surrounding soil conditioner claims, advertising, and marketing practices were displayed this month in New York. The occasion was the National Soil Conditioner Conference, sponsored by Henry A. Dreer & Co. (Philadelphia, maker of Fluffium).

The one-day meeting included an address by James A. Horton, director of the Federal Trade Commission's Bureau of Industry Co-operation, and reports of tests on various soil conditioners. In the discussions, a point frequently made was that the entire soil conditioner industry may fall into disrepute unless care is taken in all phases of merchandising its products.

Dreer's was recently charged by the FTC with making false and misleading claims in advertising its Fluffium (*CW, Sept. 20*). While many of the experiments reported at the NSCC appeared to be careful justifications of the Fluffium claims, there has been a lack of published information on soil conditioner testing. Thus the data should be welcomed by both makers and users of the artificial-humus compounds.

Well over thirty firms had representatives attending the conference. For the most part they were companies who are either dealing in soil conditioners, or are considering entering the business. It seemed clear that the present makers of soil conditioners have been successful in this year's introduction of a new product. And despite occasional setbacks, the overall picture will probably tempt more makers into the trade.

•

Industrial Supplier: Capitalized at $100,000, Tesco Chemicals of Carolina has been formed in Durham, N. C., to deal in industrial chemicals.

•

New in Milwaukee: Manufacture of phosphate coatings, plastic compounds, and industrial chemicals will be undertaken by B. & H. Chemical Co., Inc., new Milwaukee, Wis., firm capitalized at $250,000.

•

Squeeze Play: Elmer E. Mills Corp. (Chicago) is now selling a polyethylene squeeze bottle claimed to be the first plastic bottle that can be sprayed in inverted position. Bounce foot refresher is being packaged in the new container.

•

Shoe Shiner: A new shoe specialty, Gard Weatherproof Shoe Polish, will be introduced in Chicago shortly. The polish, a solution of hard waxes with about 10% silicones, is said to pene-

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Fungus Fighters: Barfair Laboratories, Inc. (Long Island City, N.Y.) is making available for testing five copper-based organic fungicides. Barfair CPCP is soluble copper pentachlorophenate; Barfair CPHB is based on copper *p*-hydroxybenzoate, Barfair CDCB, on copper 3,4-dichlorbenzoate; Barfair CMD, on soluble, coprecipitated copper methylene-bis-disalicylate, copper pentachlorophenate; Barfair CAA, on water-dispersible copper acetate. Samples are available on request.

•

Pair of Synthetics: Wax Div., Petrolite Corp., Ltd. (Los Angeles) is introducing two new synthetic waxes. Estawax, with a higher melting point than carnauba, is designed for polishes, and phonograph record manufacture. Polinel, not yet in commercial production, shows promise as a high-gloss paper-coating material.

•

Odorless, Rubber-type: Reichhold Chemicals, Inc., has just come out with what it terms a vinyl-type, latex emulsion synthetic resin vehicle suitable for making "odorless" rubber-type flat wall finishes. The product is called Wallpol, is Reichhold's first venture in this country as a maker of this type of emulsion.

Wallpol is said to dry to touch in 20 minutes, hard enough for recoating in three-four hours. The new vehicle offers paint makers a simple way to make rubber-type paints. As in the case of Reichhold's alkyd resin vehicle, Wallkyd, the manufacturer simply adds pigment and packages the paint.

•

December Gathering: Midyear meeting of the Chemical Specialties Manufacturers Association this year is scheduled for New York City, December 7, 8, 9, at the Hotel New Yorker.

•

Bid for Trade: In opening bids for a $75,000-$100,000 fumigation plant, the city of Wilmington, N.C., is making its bid to become a leading cotton-import harbor. The chemical treatment is required for the estimated 45,000,000 pounds of foreign cotton brought into this country each year. Plants are licensed to operate by the U.S. Department of Agriculture, which provides an inspecting entomologist to examine all incoming fibers. Wilmington's plant is slated for completion in time for the1953-54 import quotas.

BOOKLETS . . . . . .

Chemicals

Peroxygen Compounds

11-p. bulletin discusses peroxygen compounds with emphasis on hydrogen peroxide in reference to treating cellulose, cellulose derivatives and cellulosic materials. Entitled "Treatment of Cellulose and Cellulose Derivatives With Peroxygen Compounds," this booklet gives various examples of uses to which these compounds are applied. Literature references are listed as an appendix. Request Bulletin No. 43, Buffalo Electro-Chemical Co., Inc., Station B, Buffalo 7, N.Y.

Resins

4-p. technical data report entitled "Evaluation of Darex 43G in Gum Formula and Comparison With Competitive Resins" gives processing characteristics, storage stability, physical data, and other test information pertaining to Darex 43G. Detailed data on milling procedure employed is given in appendix. Request Bulletin C-8, Dewey and Almy Chemical Co., Organic Chemical Division, Cambridge, Mass.

Tygon Paints

16-p. booklet gives full description of Tygon paint and also includes information on Tygorust, a new "no-prep" vinyl primer, of interest in the field of corrosion-resistant coatings. This bulletin tells where and how to use Tygon paint and Tygorust primer and also includes comprehensive chemical-resistance charts and an extensive chart on recommended primers and surface treatments. Request Bulletin No. 730, The U.S. Stoneware Co., Akron 9, O.

Equipment

Water Stills

12-p. booklet entitled "Industrial Water Stills and Accessories" contains descriptions and illustrations of advanced equipment available for water distillation and storage. Recommended especially for hard waters, these stills range in size from 5 to 100 or more gallons per hour; storage tanks, from 10 to 500 gallons capacity. The bulletin includes specification tables and floor diagrams. Request Bulletin No. 950 on company letterhead, Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

Heat Exchange Equipment

12-p. general catalog covers dry blending, process and heat exchange equipment. Featured is the twin-shell dry blender. Photographs, drawings, tables and text demonstrate the uses of the new blender. Also covered are characteristics, applications, capacities, power requirements and other data for twin-shell, double-cone and ribbon blenders; kettles, evaporators, stills, agitators; and heat exchangers. Request Catalog 12, Patterson-Kelley Co., Inc., 345 Warren St., East Stroudsburg, Pa.

Marking Tools

28-p. booklet contains over one hundred different marking tools and devices. Photographs, descriptive material, catalog numbers and size charts are included. Featured is information on Mecco Safety Steel, an alloy used in most of the products in this line. Some items discussed are: stamps, marking machines and fixtures, special marking outfits, dies, inspection hammers, and steel type. Request Catalog 100, M. E. Cunningham Co., 1025 Chateau St., Pittsburgh 33, Pa.

Hook-On Instruments

8-p. booklet describes line of hook-on instruments, including applications, operation, and basic features of hook-on type AK-1A volt-ammeter, AK-2 wattmeter, and AK-3 power factor meter. Complete with photographs and diagrams. Request Bulletin GEC-901, General Electric Co., Schenectady 5, New York.

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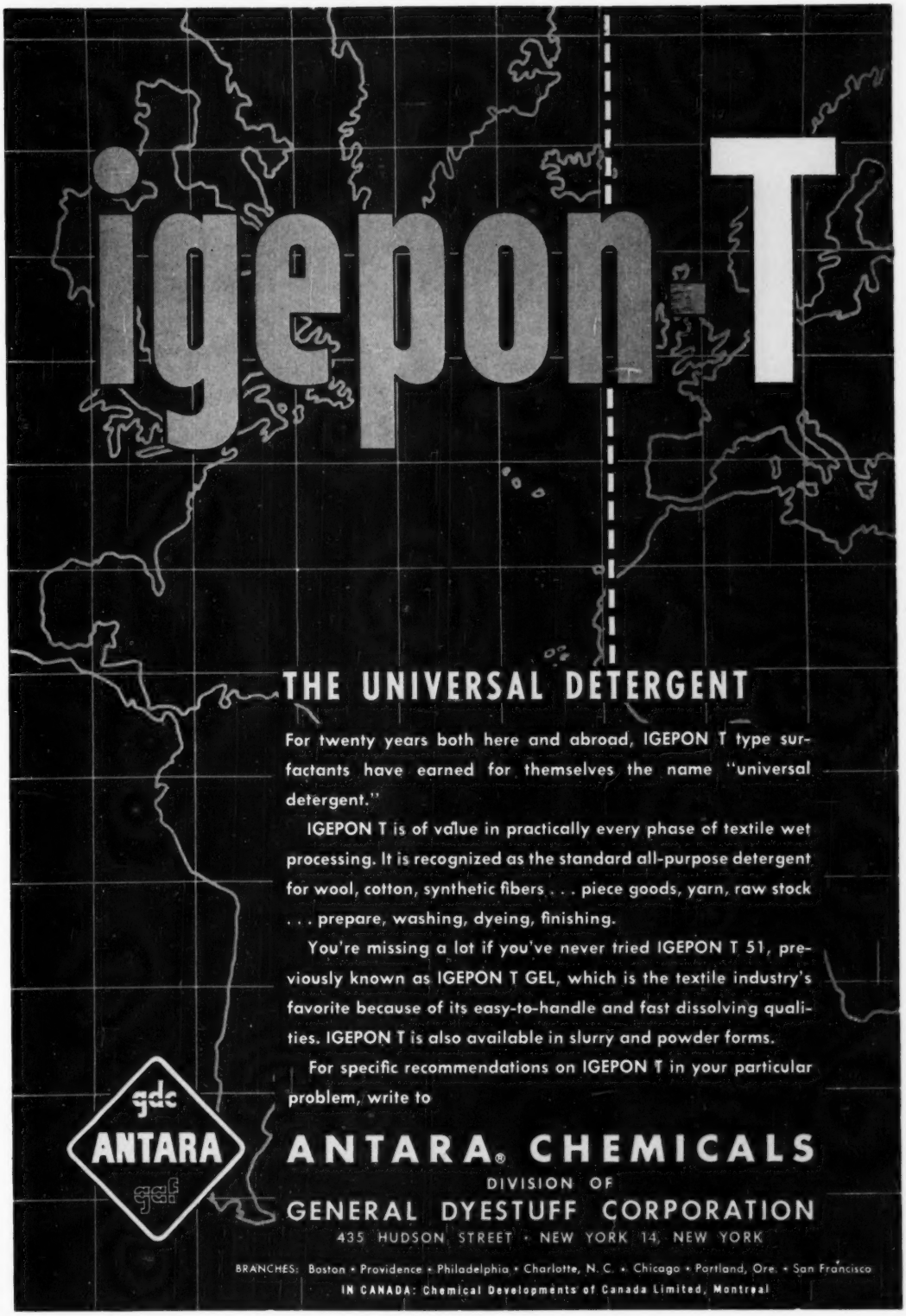

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